

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2010

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Prior-year summarized comparative information* - The financial statements include certain prior-year summarized comparative information in total but not by net asset class. Such information does not include sufficient detail to constitute a presentation in conformity with accounting principles generally accepted in the United States of America. Accordingly, such information should be read in conjunction with the financial statements for the year ended June 30, 2009, from which the summarized information was derived.

***Fair Value Measurements***

Accounting Standards Codification (ASC) Topic 820, *Fair Value Measurements and Disclosures*, establishes a framework for measuring fair value. The framework provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described below. Level 1 inputs to the valuation methodology are unadjusted quoted prices for identical assets or liabilities in active markets that the Alliance has the ability to access. Level 2 inputs to the valuation methodology include:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs other than quoted prices that are observable for the asset or liability;
- Inputs that are derived principally from or corroborated by observable market data by correlation or other means.

If the asset or liability has a specified (contractual) term, the Level 2 input must be observable for substantially the full term of the asset or liability. Level 3 inputs to the valuation methodology are unobservable and significant to the fair value measurement. The asset or liability's fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs.

The following is a description of the valuation methodology used for assets measured at fair value. There has been no change in the methodology used at June 30, 2010.

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ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2010

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Fair Value Measurements (continued)*

*Cash equivalents* - Valued at the closing price reported on the active market on which the individual securities are traded.

*U.S. Government agency obligations* - Valued at the closing price reported on the active market on which the individual securities are traded.

*Common stock* - Valued at the closing price reported on the active market on which the individual securities are traded.

*Corporate bonds, U.S. Treasury bonds and notes and asset backed bonds* - Valued at the closing price reported on the active market on which the individual securities are traded.

The method described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while the Alliance believes its valuation method is appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

Note 3 sets forth by level, within the fair value hierarchy, the assets at fair value as of June 30, 2010.

*Uncertainty in income taxes* - Effective July 1, 2009, the Alliance adopted the provision pertaining to uncertain tax positions (ASC Topic 740) and has determined that there are no material uncertain tax positions that require recognition or disclosure in the financial statements. Periods ending June 30, 2007 and subsequent remain subject to examination by applicable taxing authorities.

*Subsequent events* - Subsequent events have been evaluated through March 2, 2011, which is the date the financial statements were available to be issued.

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**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2010**

**NOTE 3 - INVESTMENTS**

	<u>2010</u> <u>(Level 1)</u>	<u>2009</u> <u>(Level 1)</u>
Cash equivalents		
Corporate bonds		
U.S. Government agency obligations		
U.S. Treasury bonds and notes		
Asset backed bonds		
Common stock		
Basic materials		
Consumer discretionary		
Consumer staples		
Financial		
Healthcare		
Industrials		
Energy		
Information technology		
Telecommunication services		

Investment income (loss) consists of the following:

	<u>2010</u>	<u>2009</u>
Interest and dividends	\$	
Realized and unrealized gains (losses) on investments		
Investment fees		
	\$	

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2010**

**NOTE 4 - FIXED ASSETS**

	<u>2010</u>	<u>2009</u>	<u>Estimated Useful Lives</u>
Office equipment	\$ (b)(4)	(b)(4)	(b)(4)
Furniture and fixtures			
Leasehold improvements			
Accumulated depreciation and amortization			
Net	\$	(b)(4)	

**NOTE 5 - LOAN PAYABLE**

On January 16, 2010, the Alliance established an unsecured line of credit with The Haverford Trust Company, enabling it to borrow from time to time an amount not exceeding (b)(4). The interest rate, based on the JP Morgan Chase Guaranty Prime Rate Floating Index, was (b)(4) at June 30, 2010. Interest expense for the year ended June 30, 2010 was (b)(4). As of June 30, 2010, the Alliance has drawn down on the line of credit for (b)(4).

**NOTE 6 - PENSION**

The Alliance has a 403(b) defined contribution pension plan covering employees who meet age and length of service requirements. Pension expense was (b)(4) and (b)(4) for the years ended June 30, 2010 and 2009, respectively.

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2010**

**NOTE 7 - TEMPORARILY AND PERMANENTLY RESTRICTED NET ASSETS**

Temporarily restricted net assets are available for the following purposes:

	<u>2010</u>	<u>2009</u> (Restated)
Aquatics	\$ (b)(4)	
Conservation medicine		
Gertrude Jasper Fund		
International training center		
Program development		
Wildlife Trust Alliance		
	\$	

Temporarily restricted net assets have been released from restrictions by satisfying the following purposes:

	<u>2010</u>	<u>2009</u>
Aquatics	\$ (b)(4)	
Conservation medicine		
International training center		
Program development		
Wildlife Trust Alliance		
	\$	

Permanently restricted net assets are restricted to investments to be held in perpetuity. The investment income is available for the following purpose:

	<u>2010</u>	<u>2009</u>
Elephant conservation	\$ (b)(4)	

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2010**

**NOTE 8 - OCCUPANCY**

In 2005, the Alliance entered into a ten-year and five-month lease for office space in New York. Rent expense for the first four (4) years will be (b)(4) annually, beginning five (5) months after commencement date. The annual fee for years five to seven shall be (b)(4) and for years eight through ten shall be (b)(4).

On September 1, 2009, the Alliance signed two one-year leases for different spaces located in St. Petersburg, FL. The leases expired on August 31, 2010 and were renewed for another year, ending August 31, 2011.

Minimum lease payments are as follows:

2011	(b)(4)
2012	
2013	
2014	
2015	

Rent expense was (b)(4) and (b)(4) for the years ended June 30, 2010 and 2009, respectively.

**NOTE 9 - CONCENTRATIONS**

Financial instruments which potentially subject the Alliance to a concentration of credit risk are cash accounts with financial institutions in excess of FDIC insurance limits.

**NOTE 10 - CONTINGENCIES**

The Alliance is subject to audits by funding sources. Management believes that the results of such audits, if any, will not have an adverse effect on the financial statements.

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ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2010

**NOTE 10 - CONTINGENCIES (continued)**

In 2006, an employee filed a discrimination charge against the Alliance with the New York District Office of the U.S. Equal Employment Opportunity Commission. The Trust filed its position statement with the Commission. The Commission has not yet issued its findings. The Alliance is confident that they will prevail. No liability has been recorded.

**NOTE 11 - ENDOWMENT FUNDS**

**General**

EcoHealth Alliance, Inc.'s endowment consists of a donor-restricted endowment fund established for elephant conservation. As required by GAAP, net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

**Interpretation of Relevant Law**

The Board of Directors of the Alliance has interpreted the Uniform Management of Institutional Funds Act (UMIFA) as being the relevant sections of the New York State Not-for-Profit Corporations Law (N-PCL) requiring preservation of the fair value of a gift as of the gift date of donor-restricted endowment funds (historic dollar value), absent explicit donor stipulations to the contrary. As a result, and in accordance with the direction of the original donor gift instrument, the Alliance classifies as permanently restricted net assets the original value of gifts donated to the permanent endowment, the original value of any subsequent gifts to the permanent endowment, and accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund. Any interest, dividends, rents, royalties or other revenue generated by donor-restricted endowment funds is used by the organization in a manner consistent with the standard of prudence required by law, absent explicit donor stipulations.

Effective September 17, 2010, New York State modified its laws governing the management and investment of charitable gifts by adopting the Uniform Prudent Management of Institutional Funds Act (NYPMIFA). NYPMIFA moves away from the "historic dollar value" standard, and permits charities to apply a spending policy to endowments based on certain specified standards of prudence. The Alliance is now governed by the NYPMIFA spending policy.

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ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2010

**NOTE 11 - ENDOWMENT FUNDS (continued)**

**Return Objectives, Strategies Employed and Spending Policy**

The investment objective of the Alliance is to invest endowment funds in a manner to protect the purchasing power of the funds and to provide for growth. The investment policy to achieve this objective is to invest in publicly traded securities, government obligations and corporate bonds. Interest earned in relation to the endowment funds is recorded as temporarily restricted income and released from restriction upon expenditure for the program for which the endowment fund was established.

**Funds with Deficiencies**

Due to market declines in prior years, the endowment investment value is (b)(4). As a result, the endowment fund has a (b)(4) deficiency, which was funded by unrestricted net assets. It is the Alliance's goal to utilize future endowment earnings to reimburse the unrestricted net assets for the deficiency. During the period, no funds will be expensed from the earnings.

**Endowment Net Asset Composition by Type of Fund as of June 30, 2010**

The endowment net asset composition of (b)(4) consists of permanently donor-restricted funds.

**Changes in Endowment Net Assets for the Year Ended June 30, 2010**

	Unrestricted	Permanently Restricted
Endowment net assets, beginning of year	\$	(b)(4)
Realized losses		
Unrealized gains		
Interest and dividends		
Endowment net assets, end of year	\$	

**NOTE 12 - RESTATEMENT**

In 2010, the Alliance reviewed its restricted funds and, based upon discovery of additional information, the Gertrude Jasper Fund was restated as a temporarily restricted net asset.

ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2010

LOEB & TROPER LLP

	CFDA Number	Federal Contract Number	Pass-through Entity Identification Number	Federal Expenditures
<i><u>Research and Development Cluster</u></i>				
U.S. Department of Interior Endangered Species Conservation	15.612	401817 J 108 1448-40181-7-J108		\$ (b)(4)
Total				
Wildlife Without Borders - Africa Program	15.651	98210-8-G732		
U.S. Geological Survey - Research and Data Collection	15.808	062070-0171		
Total U.S. Department of Interior				
U.S. Department of Agriculture Wildlife Services	10.028	08 7100 0206-CA 09 7100 0206-CA		
Total				
Total U.S. Department of Agriculture				
U.S. Department of Commerce Southeast Area Monitoring and Assessment Program	11.435	P.O. NFN5300-7-14814		
Pass-through from Georgia Department of Natural Resources			NA06NMFU720266	
Pass-through from National Fish and Wildlife Foundation Marine Mammal Data Program	11.439		2010-0073-005	
Total U.S. Department of Commerce				
National Science Foundation Social, Behavioral, and Economic Sciences	47.075	BCS-0826779		
Pass-through from University of California-Santa Cruz Biological Sciences	47.074		EF-0622391	
Total National Science Foundation				

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ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2010

2

Research and Development Cluster (continued)

U.S. Department of Health and Human Services  
National Institute of Health  
Allergy, Immunology and Transplantation Research

CFDA Number	Federal Contract Number	Pass-through Entity Identification Number	Federal Expenditures
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93.855	K08A1067549-01A2 1R01AI079231-01		\$
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Pass-through from Health Research, Inc.

001697-01

Total

International Research and Research Training

93.989	2R01TW005869-05 3R01TW005869-05S1 3R01TW005869-05S2 3R01TW005869-05S3 3R01TW005869-05S4		
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Total

ARRA-Trans-NIH Recovery Act Research Support

93.701	3R01TW005869-06S1 3R01TW005869-06S2		
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Total

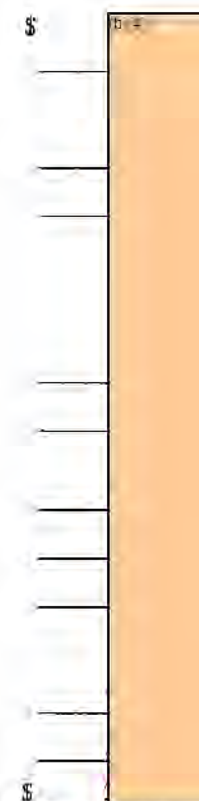
Total U.S. Department of Health and Human Services

United States Agency for International Development  
Pass-through from University of California - Davis  
Emerging Pandemic Threat Program

98.XXX	200910804-04	N/A	
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Total United States Agency for International Development

Total expenditures of federal awards (Research and Development Cluster)



See independent auditor's report.

The accompanying notes are an integral part of this schedule.



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2010

**NOTE 1 - BASIS OF PRESENTATION**

The accompanying schedule of expenditures of federal awards (the "Schedule") includes the federal grant activity of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. under programs of the federal government for the year ended June 30, 2010. The information in this schedule is presented in accordance with the requirements of Office of Management and Budget (OMB) Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*. Because the Schedule presents only a selected portion of the operations of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc., it is not intended to and does not present the financial position, changes in net assets or cash flows of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

Expenditures reported on the Schedule are reported on the accrual basis of accounting. Such expenditures are recognized following the cost principles contained in OMB Circular A-122, *Cost Principles for Non-Profit Organizations*, wherein certain types of expenditures are not allowable or are limited as to reimbursement. Negative amounts shown on the Schedule represent adjustments or credits made in the normal course of business to amounts reported as expenditures in prior years. Pass-through entity identifying numbers are presented where available.

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**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2010**

**NOTE 3 - SUBRECIPIENTS**

Of the federal expenditures presented in the schedule, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. provided federal awards to subrecipients as follows:

<b>CFDA Number</b>	<b>Program Name</b>	<b>Amount Provided to Subrecipient</b>
11.435	Southeast Area Monitoring and Assessment Program	\$ (b)(4)
15.612	Endangered Species Conservation	
47.075	Social, Behavioral and Economic Sciences	
93.855	Allergy, Immunology and Transplantation Research	
93.989	International Research and Research Training	
	Total	\$



**Independent Auditor's Report on  
Internal Control Over Financial Reporting  
and on Compliance and Other Matters  
Based on an Audit of Financial Statements Performed  
in Accordance with Government Auditing Standards**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

We have audited the financial statements of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of and for the year ended June 30, 2010, and have issued our report thereon dated March 2, 2011. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States.

**Internal Control Over Financial Reporting**

In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A *material weakness* is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control over financial reporting was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over financial reporting that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over financial reporting that we consider to be material weaknesses, as defined above.

**Compliance and Other Matters**

As part of obtaining reasonable assurance about whether EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s financial statements are free of material misstatement, we performed tests of their compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit and, accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Troper LLP*

March 2, 2011



**Independent Auditor's Report on Compliance with  
Requirements That Could Have a Direct and Material Effect on  
Each Major Program and on Internal Control Over Compliance  
in Accordance with OMB Circular A-133**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

**Compliance**

We have audited EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with the types of compliance requirements described in the *OMB Circular A-133 Compliance Supplement* that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2010. EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs. Compliance with the requirements of laws, regulations, contracts, and grants applicable to each of its major federal programs is the responsibility of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s management. Our responsibility is to express an opinion on EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance based on our audit.

We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and OMB Circular A-133. Those standards and OMB Circular A-133 require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion. Our audit does not provide a legal determination of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements.

In our opinion, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. complied, in all material respects, with the compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2010.

**Internal Control Over Compliance**

Management of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. is responsible for establishing and maintaining effective internal control over compliance with requirements of laws, regulations, contracts, and grants applicable to federal programs. In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance with the requirements that could have a direct and material effect on a major federal program to determine the auditing procedures for the purpose of expressing our opinion on compliance and to test and report on internal control over compliance in accordance with OMB Circular A-133, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance.

*A deficiency in internal control over compliance* exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. A *material weakness in internal control over compliance* is a deficiency, or combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over compliance that we consider to be *material weaknesses*, as defined above.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Troper LLP*

March 2, 2011

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF FINDINGS AND QUESTIONED COSTS

YEAR ENDED JUNE 30, 2010

**Section I - Summary of Auditor's Results**

**Financial Statements**

Type of auditor's report issued: Unqualified

Internal control over financial reporting:

Material weakness(es) identified?	<u>          </u> yes	<u>  X  </u> no
Significant deficiency(ies) identified?	<u>          </u> yes	<u>  X  </u> none reported

Noncompliance material to financial statements noted?            yes   X   no

**Federal Awards**

Internal control over major programs:

Material weakness(es) identified?	<u>          </u> yes	<u>  X  </u> no
Significant deficiency(ies) identified?	<u>          </u> yes	<u>  X  </u> none reported

Type of auditor's report issued on compliance for major programs: Unqualified

Any audit findings disclosed that are required to be reported in accordance with Section 510(a) of Circular A-133?            yes   X   no

**Identification of major program:**

<u>CFDA Number</u>	<u>Name of Federal Program or Cluster</u>
Various	Research and Development Cluster

Dollar threshold used to distinguish between Type A and Type B programs:                     \$300,000                    

Auditee qualified as low-risk auditee?            yes   X   no

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF FINDINGS AND QUESTIONED COSTS**

**YEAR ENDED JUNE 30, 2010**

**Section II - Financial Statement Findings**

No matters were reported.

**Section III - Federal Award Findings and Questioned Costs**

No matters were reported.



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SUMMARY SCHEDULE OF PRIOR AUDIT FINDINGS

YEAR ENDED JUNE 30, 2010

**09-01 Cash Disbursements**

During the course of the audit, we sampled 60 disbursements and noted that approximately 33% did not indicate approval for payment on the invoice. Although the same person approves these invoices and signs the checks, it is good business practice to initial the invoice prior to payment. We recommend that WLTi better document their review of invoices prior to payment.

**Follow-up**

This condition was resolved in 2010.

**09-02 - Allowable Costs**

**Research and Development Cluster**

CFDA #	CFDA Name
11.435	Southeast Area Monitoring and Assessment Program
47.074	Biological Sciences
10.028	Wildlife Services
93.855	Allergy, Immunology and Transplantation Research
93.989	International Research and Research Training


**Criteria**

Federal grantors' requirements require that recipients of direct and indirect federal awards obtain supporting documentation for all expenditures of funds.

**Condition**

We noted that EcoHealth Alliance, Inc. did not receive sufficient supporting documentation for 7 of the 60 disbursements tested.

**Context**

 of expenditures tested were not supported by sufficient documentation.


**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SUMMARY SCHEDULE OF PRIOR AUDIT FINDINGS**

**YEAR ENDED JUNE 30, 2010**

**09-02 - Allowable Costs (continued)**

**Questioned Costs**

<u>CFDA #</u>	<u>CFDA Name</u>		
11.435	Southeast Area Monitoring and Assessment Program	\$	
47.074	Biological Sciences		
10.028	Wildlife Services		
93.855	Allergy, Immunology and Transplantation Research		
93.989	International Research and Research Training		
		\$	

**Effect**

The lack of supporting documentation could result in fraudulent invoices being charged to federal programs.

**Cause**

Management misfiled these invoices.

**Recommendation**

Prior to paying any invoice, supporting documentation must be received and reviewed by a responsible person.

**Follow-up**

This condition was resolved in 2010.

**ECOHEALTH ALLIANCE, INC.  
(FORMERLY KNOWN AS  
WILDLIFE TRUST, INC.) AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**MANAGEMENT LETTER**

**JUNE 30, 2010**



**Board of Trustees  
Ecohealth Alliance, Inc.  
and Wildlife Preservation  
Trust International, Inc.**

In planning and performing our audit of the financial statements of Ecohealth Alliance, Inc. (formerly known as Wildlife Trust, Inc.) and Wildlife Preservation Trust International, Inc. ("EAI") as of and for the year ended June 30, 2010 in accordance with auditing standards generally accepted in the United States of America, we considered EAI's internal control over financial reporting (internal control) as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EAI's internal control. Accordingly, we do not express an opinion on the effectiveness of EAI's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis.

Our consideration of internal control was for the limited purpose described in the first paragraph, and was not designed to identify all deficiencies in internal control that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control that we consider to be material weaknesses, as defined above.

This communication is intended solely for the information and use of the Board of Trustees, management and others within EAI and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Troper LLP*

March 2, 2011

**ECOHEALTH ALLIANCE, INC.  
(FORMERLY KNOWN AS WILDLIFE TRUST, INC.)  
AND WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**CONSOLIDATED FINANCIAL STATEMENTS,  
AUDITOR'S REPORTS AND SCHEDULE  
RELATED TO OFFICE OF MANAGEMENT  
AND BUDGET CIRCULAR A-133**

**JUNE 30, 2011**

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**TABLE OF CONTENTS**

**Independent Auditor's Report on Financial Statements  
and Schedule of Expenditures of Federal Awards**

**Exhibit**

- A - Consolidated Balance Sheet**
- B - Consolidated Statement of Activities**
- C - Consolidated Statement of Functional Expenses**
- D - Consolidated Statement of Cash Flows**

**Notes to Financial Statements**

**Schedule of Expenditures of Federal Awards**

**Notes to Schedule of Expenditures of Federal Awards**

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**TABLE OF CONTENTS  
(continued)**

**Independent Auditor's Report on Internal Control  
Over Financial Reporting and on Compliance and  
Other Matters Based on an Audit of Financial Statements  
Performed in Accordance with Government Auditing Standards**

**Independent Auditor's Report on Compliance  
with Requirements That Could Have a Direct and  
Material Effect on Each Major Program and on Internal  
Control Over Compliance in Accordance with OMB Circular A-133**

**Schedule of Findings and Questioned Costs**



**Independent Auditor's Report on Financial Statements  
and Schedule of Expenditures of Federal Awards**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

We have audited the accompanying consolidated balance sheet of EcoHealth Alliance, Inc. (formerly known as Wildlife Trust, Inc.) and Wildlife Preservation Trust International, Inc. as of June 30, 2011, and the related consolidated statements of activities, functional expenses and cash flows for the year then ended. These financial statements are the responsibility of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s management. Our responsibility is to express an opinion on these financial statements based on our audit. The prior year summarized comparative information has been derived from EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s June 30, 2010 financial statements and, in our report dated March 2, 2011, we expressed an unqualified opinion on those financial statements.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of June 30, 2011, and the changes in their net assets and their cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.



In accordance with *Government Auditing Standards*, we have also issued our report dated December 16, 2011 on our consideration of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting and on our tests of their compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on internal control over financial reporting or on compliance. That report is an integral part of an audit conducted in accordance with *Government Auditing Standards* and should be considered in assessing the results of our audit.

Our audit was conducted for the purpose of forming an opinion on the basic consolidated financial statements taken as a whole. The accompanying schedule of expenditures of federal awards is presented for purposes of additional analysis as required by U.S. Office of Management and Budget Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations* and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic consolidated financial statements and, in our opinion, is fairly stated, in all material respects, in relation to the basic consolidated financial statements taken as a whole.



December 16, 2011

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**CONSOLIDATED BALANCE SHEET**

**JUNE 30, 2011 AND 2010**

	<u>2011</u>	<u>2010</u> (Restated Note 8)
<b>ASSETS</b>		
Cash and cash equivalents	\$	(b)(4)
Investments (Note 3)		
Contributions receivable (Note 4)		
Government contracts receivable - current		
Other receivable		
Prepaid expenses		
Security deposits		
Fixed assets - net (Note 5)		
<b>Total assets</b>	\$	
<b>LIABILITIES AND NET ASSETS</b>		
Accounts payable and accrued expenses	\$	
Loan payable (Note 6)		
Refundable advances		
<b>Total liabilities</b>		
Net assets (Exhibit B)		
Unrestricted		
Temporarily restricted (Note 8)		
Permanently restricted (Notes 8 and 13)		
<b>Total net assets</b>		
<b>Total liabilities and net assets</b>	\$	

See independent auditor's report.

The accompanying notes are an integral part of these statements.

## EXHIBIT B

**YEAR ENDED JUNE 30, 2011**

LOEB & TROPER LLP

-continued-

**ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**EXHIBIT B**

-2-

**CONSOLIDATED STATEMENT OF ACTIVITIES**

**YEAR ENDED JUNE 30, 2011**

**(With Summarized Financial Information  
for the Year Ended June 30, 2010)**

**LOEB & TROPER LLP**

**Expenses (Exhibit C)**

Program service  
Research and education

**Supporting services**

Management and general  
Fund raising  
Direct costs of special events

Total supporting services expenses

Total expenses

Operating gain (loss)

**Nonoperating activities**

Investment income (Note 3)

Change in net assets (Exhibit D)

Net assets - beginning of the year (Note 8)

Net assets - end of year (Exhibit A)

2011				2010
Unrestricted	Temporarily Restricted	Permanently Restricted	Total	
\$	b(4)			
\$				

See independent auditor's report.

The accompanying notes are an integral part of these statements.

ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

CONSOLIDATED STATEMENT OF FUNCTIONAL EXPENSES

YEAR ENDED JUNE 30, 2011  
(With Summarized Financial Information  
for the Year Ended June 30, 2010)

	Research and Education	Management and General	Supporting Services		Total	2011	2010
			Fund Raising	Direct Costs of Special Events			
Salaries							
Payroll taxes and employee benefits							
Total salaries and related expenses							
Professional fees (Note 10)							
Subcontracts							
Grants to other organizations							
Field costs							
Meetings and conferences							
Travel and entertainment							
Occupancy (Note 9)							
Printing							
Postage							
Supplies							
Telephone							
Equipment							
Dues and subscriptions							
Miscellaneous							
Repairs and maintenance							
Depreciation and amortization							
Catering and facility rental							
Bad debts							
Interest expense							
Investment expenses							
Total other than salaries and related expenses							
Total expenses							
Less expenses netted against investment income							
Total expenses as reported by function on the statement of activities (Exhibit B)							

See independent auditor's report.

The accompanying notes are an integral part of these statements.



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**CONSOLIDATED STATEMENT OF CASH FLOWS**

**YEARS ENDED JUNE 30, 2011 AND 2010**

	2011	2010
Cash flows from operating activities		
Change in net assets (Exhibit B)		
Adjustments to reconcile change in net assets to net cash provided (used) by operating activities		
Depreciation and amortization		
Realized and unrealized gains on investments		
Decrease (increase) in assets		
Contributions receivable		
Government contracts receivable		
Other receivable		
Prepaid expenses		
Security deposits		
Increase (decrease) in liabilities		
Accounts payable and accrued expenses		
Refundable advances		
Net cash provided (used) by operating activities		
Cash flows from investing activities		
Purchase of fixed assets		
Proceeds from sale of investments		
Purchase of investments		
Net cash provided (used) by investing activities		
Cash flows from financing activities		
Proceeds from loan		
Repayment of loan		
Net cash provided (used) by financing activities		
Net change in cash and cash equivalents		
Cash and cash equivalents - beginning of year		
Cash and cash equivalents - end of year		
Supplemental disclosure of cash flow information		
Cash paid during the year for interest		

See independent auditor's report.

The accompanying notes are an integral part of these statements.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2011**

**NOTE 1 - ORGANIZATION AND TAX STATUS**

On June 22, 2010, Wildlife Trust, Inc. changed its name to EcoHealth Alliance, Inc.

EcoHealth Alliance, Inc. was incorporated on July 20, 2000 in the Commonwealth of Massachusetts. EcoHealth Alliance, Inc.'s mission is to protect wildlife and safeguard ecosystems through integrated programs of research, hands-on wildlife management, professional training and public education.

EcoHealth Alliance, Inc. is funded primarily by contributions and government contracts and grants.

Wildlife Preservation Trust International, Inc. (WPTI) was incorporated on January 7, 1976 in the state of Pennsylvania. WPTI is a dormant corporation. In 2000, WPTI transferred the predominance of its assets to Wildlife Trust Inc., now known as EcoHealth Alliance, Inc.

EcoHealth Alliance, Inc. and WPTI are related through common control.

EcoHealth Alliance, Inc. and WPTI are exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code.

EcoHealth Alliance, Inc. and WPTI are collectively referred to as "EHA."

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

*Basis of accounting* - The financial statements are prepared on the accrual basis of accounting.

*Principles of consolidation* - All material intercompany transactions and balances have been eliminated in the consolidation.

*Use of estimates* - The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Cash and cash equivalents* - EHA considers highly liquid instruments purchased with original maturities of three months or less to be cash equivalents. EHA has periodically throughout the year maintained balances in various operating and money market accounts in excess of federally insured limits.

*Investments* - Investments are recorded at fair value. EHA invests in various investment securities. Investment securities are exposed to various risks such as interest rate, market and credit risks. Due to the level of risk associated with investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term, based upon the markets' fluctuations, and that such changes could materially affect EHA's financial statements.

*Contributions receivable* - Unconditional promises to give that are expected to be collected within one year are recorded at net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the present value of their estimated future cash flows. The discounts on those amounts are computed using risk-adjusted interest rates applicable to the years in which the promises are received. Amortization of the discounts is included in contribution revenue. Revenues on conditional promises to give are not included as support until the conditions are subsequently met.

*Government contracts receivable* - Government contracts receivable are recorded when qualifying expenditures are incurred and EHA has a signed contract for services.

*Allowance for doubtful accounts* - EHA determines whether an allowance for uncollectibles should be provided for contributions and government contracts receivable. Such estimates are based on management's assessment of the aged basis of its contributions and other sources, current economic conditions and historical information. Contributions and government contracts receivable are written off against the allowance for doubtful accounts when all reasonable collection efforts have been exhausted.

*Fixed assets* - Fixed assets are recorded at cost and depreciated over their estimated useful lives using the straight-line method. Leasehold improvements are recorded at cost and are being amortized over the shorter of the term of the lease or its estimated useful life using the straight-line method. Items with a cost of \$1,000 and an estimated useful life of more than one year are capitalized.

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

***Refundable advances*** - Refundable advances consist of advances received on government contracts that are anticipated to be earned in the future.

***Net assets*** - Unrestricted net assets include funds having no restriction as to use or purpose imposed by donors. Temporarily restricted net assets are those whose use has been limited by donors to a specific time period or purpose. Permanently restricted net assets have been restricted by donors to be maintained in perpetuity.

***Revenues from government agencies*** - Revenues from government agencies are recognized when earned. Expense-based grants are recognized as allowable expenses are incurred. Performance-based grants are recognized as milestones are achieved.

***Contributed services*** - Contributed services are recognized as revenue if the services create or enhance nonfinancial assets or require specialized skills, are provided by individuals possessing those skills, and typically need to be purchased if not provided by donation.

***Contributions*** - Unconditional contributions, including promises to give cash and other assets, are reported at fair value at the date the contribution is received. Contributions are reported as either temporarily or permanently restricted support if they are received with donor stipulations that limit the use of the donated assets. When a donor restriction expires, that is, when a stipulated time restriction ends or purpose restriction is accomplished, temporarily restricted net assets are reclassified as unrestricted net assets and reported in the statement of activities as net assets released from restrictions.

***In-kind donations*** - In-kind donations of legal services are recorded at fair value.

***Functional allocation of expenses*** - The costs of providing EHA's programs and other activities have been summarized on a functional basis. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

***Rent expense*** - EHA leases space at various locations. All leases are operating leases. Rent expense is recognized on the first day of each month for the current month's rent. All leases are reflected on the straight-line basis.

***Measure of operations*** - EHA excludes investment income from its measure of operations.

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Prior-year summarized comparative information* - The financial statements include certain prior-year summarized comparative information in total but not by net asset class. Such information does not include sufficient detail to constitute a presentation in conformity with accounting principles generally accepted in the United States of America. Accordingly, such information should be read in conjunction with the financial statements for the year ended June 30, 2010, from which the summarized information was derived.

***Fair Value Measurements and Disclosures***

*Fair Value Measurements and Disclosures*, ASC Topic 820, establishes a framework for measuring fair value. The framework provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described below. Level 1 inputs to the valuation methodology are unadjusted quoted prices for identical assets or liabilities in active markets that EHA has the ability to access. Level 2 inputs to the valuation methodology include:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs other than quoted prices that are observable for the asset or liability;
- Inputs that are derived principally from or corroborated by observable market data by correlation or other means.

If the asset or liability has a specified (contractual) term, the Level 2 input must be observable for substantially the full term of the asset or liability. Level 3 inputs to the valuation methodology are unobservable and significant to the fair value measurement. The asset or liability's fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs.

The following is a description of the valuation methodology used for assets measured at fair value. There has been no change in the methodology used at June 30, 2011 as compared to 2010.

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

***Fair Value Measurements and Disclosures (continued)***

***Cash equivalents*** - Valued at the closing price reported on the active market on which the individual securities are traded.

***Government and government agency bonds*** - Valued at the closing price reported on the active market on which the individual securities are traded.

***Common stock*** - Valued at the closing price reported on the active market on which the individual securities are traded.

***Corporate bonds, U.S. Treasury bonds and notes, asset-backed bonds, and ETFs*** - Valued at the closing price reported on the active market on which the individual securities are traded.

The method described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while EHA believes its valuation method is appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The assets at fair value as of June 30, 2011 and 2010, respectively, are set forth by level within the fair value hierarchy in Note 3.

***Uncertainty in income taxes*** - EHA has determined that there are no material uncertain tax positions that require recognition or disclosure in the financial statements. Periods ending June 30, 2008 and subsequent remain subject to examination by applicable taxing authorities.

***Subsequent events*** - Subsequent events have been evaluated through December 16, 2011, which is the date the financial statements were available to be issued.

***Reclassification*** - Interest expense has been reclassified to conform to the current year's presentation.

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2011**

**NOTE 3 - INVESTMENTS**

	<b>2011 (Level 1)</b>	<b>2010 (Level 1)</b>
Cash equivalents	\$ (b)(4)	
Corporate bonds		
Government and government agency bonds		
U.S. treasury bonds and notes		
Asset-backed bonds		
Fixed income ETFs		
Common stock		
Basic materials		
Consumer discretionary		
Consumer staples		
Financial		
Healthcare		
Industrials		
Energy		
Information technology		
Equity mutual fund/ETFs		
	\$	

Investment income consists of the following:

	<b>2011</b>	<b>2010</b>
Interest and dividends	\$ (b)(4)	
Realized and unrealized gains on investments		
Investment fees		
	\$	

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2011**

**NOTE 4 - CONTRIBUTIONS RECEIVABLE**

Contributions receivable are recorded at their net realizable value. These contributions have been discounted over the payment period using a discount rate of (b)(4). The contributions receivable are expected to be paid within the next three years.

2012	\$	(b)(4)
2013		
2014		
Less discount to present value		
Net	\$	

**NOTE 5 - FIXED ASSETS**

	<u>2011</u>	<u>2010</u>	<u>Estimated Useful Lives</u>
Office equipment	\$	(b)(4)	3 years
Furniture and fixtures			10 years
Leasehold improvements			10 years
Accumulated depreciation and amortization			
Net	\$		

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2011**

**NOTE 6 - LOAN PAYABLE**

On January 16, 2010, EHA established an unsecured line of credit with The Haverford Trust Company, enabling it to borrow from time to time an amount not exceeding (b)(4). The interest rate, based on the JP Morgan Chase Guaranty Prime Rate Floating Index, was (b)(4) at June 30, 2011. Interest expense for the year ended June 30, 2011 was (b)(4). The loan was paid off at December 31, 2010. The line of credit was extended for up to (b)(4) through January 13, 2013.

**NOTE 7 - PENSION**

EHA has a 403(b) defined contribution pension plan covering employees who meet age and length of service requirements. Pension expense was (b)(4) and (b)(4) for the years ended June 30, 2011 and 2010, respectively.

**NOTE 8 - TEMPORARILY AND PERMANENTLY RESTRICTED NET ASSETS**

Temporarily restricted net assets are available for the following purposes:

	2011	2010 (Restated)
Aquatics programs	\$ (b)(4)	(b)(4)
Conservation medicine field activities		
Gertrude Jasper Fund		
International training center		
Program development		
Predict and prevent programs		
Ecohealth Alliance Partners		
Elephant conservation		
	\$	

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 8 - TEMPORARILY AND PERMANENTLY RESTRICTED NET ASSETS**  
(continued)

Temporarily restricted net assets have been released from restrictions by satisfying the following purposes:

	2011	2010
Aquatics programs	\$ (b)(4)	\$ (b)(4)
Conservation medicine field activities		
International training center		
Predict and prevent programs		
Program development		
Gertrude Jasper Fund		
Ecohealth Alliance Partners		

Opening temporarily restricted net assets were restated by (b)(4) to correct for misclassified net assets.

	Unrestricted	Temporarily Restricted
Net assets - beginning of year - as originally reported	\$ (b)(4)	\$ (b)(4)
Restatement		
Net assets - beginning of year - as restated	\$	\$

Permanently restricted net assets are restricted to investments to be held in perpetuity. The investment income is available for the following purpose:

	2011	2010
Elephant conservation	\$ (b)(4)	\$ (b)(4)

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2011**

**NOTE 9 - OCCUPANCY**

In 2005, EHA entered into a ten-year and five-month lease for office space in New York. Rent for the first four (4) years will be (b)(4) annually, beginning five (5) months after commencement date. The annual fee for years five to seven shall be (b)(4) and for years eight through ten shall be (b)(4).

On September 1, 2010, EHA signed two one-year leases for different spaces located in St. Petersburg, FL. The leases expired on August 31, 2011. During the year ended June 30, 2011, EHA closed the Florida office and ceased all operations in the state.

Minimum lease payments are as follows:

2012	\$ (b)(4)
2013	
2014	
2015	
	\$

Rent expense was (b)(4) and (b)(4) for the years ended June 30, 2011 and 2010, respectively.

**NOTE 10 - IN-KIND DONATIONS**

EHA received the following in-kind donations:

Legal services \$ (b)(4)

**NOTE 11 - CONCENTRATIONS**

Financial instruments which potentially subject EHA to a concentration of credit risk are cash accounts with financial institutions in excess of FDIC insurance limits.

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 12 - CONTINGENCIES**

EHA is subject to audits by funding sources. Management believes that the results of such audits, if any, will not have an adverse effect on the financial statements.

In 2006, an employee filed a discrimination charge against EHA with the New York District Office of the U.S. Equal Employment Opportunity Commission. The Trust filed its position statement with the Commission. The Commission has issued its findings. EHA has settled with the claimant and a liability has been recorded.

**NOTE 13 - ENDOWMENT FUNDS**

*General*

EcoHealth Alliance, Inc.'s endowment consists of a donor-restricted endowment fund established for elephant conservation. As required by GAAP, net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

*Interpretation of Relevant Law*

The Board of Directors of EHA has interpreted the Uniform Management of Institutional Funds Act (UMIFA) as being the relevant sections of the New York State Not-for-Profit Corporations Law (N-PCL) requiring preservation of the fair value of a gift as of the gift date of donor-restricted endowment funds (historic dollar value), absent explicit donor stipulations to the contrary. As a result, and in accordance with the direction of the original donor gift instrument, EHA classifies as permanently restricted net assets the original value of gifts donated to the permanent endowment, the original value of any subsequent gifts to the permanent endowment, and accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund. Any interest, dividends, rents, royalties or other revenue generated by donor-restricted endowment funds is used by the organization in a manner consistent with the standard of prudence required by law, absent explicit donor stipulations.

Effective September 17, 2011, New York State modified its laws governing the management and investment of charitable gifts by adopting the Uniform Prudent Management of Institutional Funds Act (NYPMIFA). NYPMIFA moves away from the "historic dollar value" standard, and permits charities to apply a spending policy to endowments based on certain specified standards of prudence. EHA is now governed by the NYPMIFA spending policy.

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2011

**NOTE 13 - ENDOWMENT FUNDS (continued)**

**Return Objectives, Strategies Employed and Spending Policy**

The investment objective of EHA is to invest endowment funds in a manner to protect the purchasing power of the funds and to provide for growth. The investment policy to achieve this objective is to invest in publicly traded securities, government obligations and corporate bonds. Interest earned in relation to the endowment funds is recorded as temporarily restricted income and released from restriction upon expenditure for the program for which the endowment fund was established.

**Funds with Deficiencies**

There are no endowment funds with deficiencies.

**Endowment Net Asset Composition by Type of Fund as of June 30, 2011**

The endowment net asset composition of (b)(4) consists of (b)(4) permanently donor-restricted funds and (b)(4) of accumulated earnings thereon, which are included as temporarily restricted funds.

**Changes in Endowment Net Assets for the Year Ended June 30, 2011**

	<u>Unrestricted</u>	<u>Temporarily Restricted</u>	<u>Permanently Restricted</u>	<u>Total</u>
Endowment net assets, beginning of year	\$	(b)(4)		
Realized gains				
Unrealized gains				
Interest and dividends				
Recovery of endowment fund deficiencies				
Endowment net assets, end of year	\$			

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2011

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal CFDA Number	Pass-through Entity Identification Number	Federal Expenditures
<b><u>Research and Development Cluster</u></b>			
U.S. Department of Interior			
Fish and Wildlife Service			
Wildlife Conservation and Restoration	15.625		
Wildlife Without Borders - Africa Program	15.651		
Research grants (generic)	15.650		
Coastal Program	15.630		
Total U.S. Department of Interior			
U.S. Department of Agriculture			
Animal and Plant Health Inspection Service			
Wildlife Services	10.028		
Total			
Total U.S. Department of Agriculture			
U.S. Department of Commerce			
National Oceanic and Atmospheric Administration			
Southeast Area Monitoring and Assessment			
Program	11.435		
Total			
Pass-through from Georgia Department of			
Natural Resources		N/A	
Total			
Marine Mammal Data Program	11.439		
Pass-through from National Fish and Wildlife			
Foundation		2010-0073-005	
Total U.S. Department of Commerce			

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2011

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal CFDA Number	Pass-through Entity Identification Number	Federal Expenditures
<i><u>Research and Development Cluster (continued)</u></i>			
National Science Foundation			
Social, Behavioral, and Economic Sciences	47.075		\$ (C)41
Total			
Biological Sciences	47.074		
Viral Pathogens			
EcohealthNet			
Pass-through from University of California-Santa Cruz		EF-0622391	
Total			
Total National Science Foundation			
U.S. Department of Health and Human Services			
National Institute of Health			
Allergy, Immunology and Transplantation Research	93.855		
Total			
International Research and Research Training	93.989		
Total			
ARRA - Trans-NIH Recovery Act Research Support	93.701		
Total			
Total U.S. Department of Health and Human Services			

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS

YEAR ENDED JUNE 30, 2011

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal CFDA Number	Pass-through Entity Identification Number	Federal Expenditures
<i><u>Research and Development Cluster (continued)</u></i>			
United States Agency for International Development Emerging Pandemic Threat Program Pass-through from University of California - Davis	98.XXX	N/A	\$
Total United States Agency for International Development			\$
Total expenditures of federal awards (Research and Development Cluster)			\$

See independent auditor's report.

The accompanying notes are an integral part of this schedule.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2011**

**NOTE 1 - BASIS OF PRESENTATION**




The accompanying schedule of expenditures of federal awards (the "Schedule") includes the federal grant activity of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. under programs of the federal government for the year ended June 30, 2011. The information in this schedule is presented in accordance with the requirements of Office of Management and Budget (OMB) Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*. Because the Schedule presents only a selected portion of the operations of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc., it is not intended to and does not present the financial position, changes in net assets or cash flows of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

Expenditures reported on the Schedule are reported on the accrual basis of accounting. Such expenditures are recognized following the cost principles contained in OMB Circular A-122, *Cost Principles for Non-Profit Organizations*, wherein certain types of expenditures are not allowable or are limited as to reimbursement. Negative amounts shown on the Schedule represent adjustments or credits made in the normal course of business to amounts reported as expenditures in prior years. Pass-through entity identifying numbers are presented where available.

**NOTE 3 - SUBRECIPIENTS**

Of the federal expenditures presented in the Schedule, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. provided federal awards to subrecipients as follows:

<b>CFDA Number</b>	<b>Program Name</b>	<b>Amount Provided to Subrecipient</b>
93.855	Allergy, Immunology and Transplantation Research	\$ 
93.989	International Research and Research Training	\$ 
	Total	\$ 



**Independent Auditor's Report on  
Internal Control Over Financial Reporting  
and on Compliance and Other Matters  
Based on an Audit of Financial Statements Performed  
in Accordance with Government Auditing Standards**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

We have audited the financial statements of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of and for the year ended June 30, 2011, and have issued our report thereon dated December 16, 2011. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States.

**Internal Control Over Financial Reporting**

Management of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. is responsible for establishing and maintaining effective internal control over financial reporting. In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A *material weakness* is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control over financial reporting was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over financial reporting that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over financial reporting that we consider to be material weaknesses, as defined above.

*Compliance and Other Matters*

As part of obtaining reasonable assurance about whether EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s financial statements are free of material misstatement, we performed tests of their compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit and, accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb + Troper LLP*

December 16, 2011





**Independent Auditor's Report on Compliance with  
Requirements That Could Have a Direct and Material Effect on  
Each Major Program and on Internal Control Over Compliance  
in Accordance with OMB Circular A-133**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

**Compliance**

We have audited EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with the types of compliance requirements described in the *OMB Circular A-133 Compliance Supplement* that could have a direct and material effect on each of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s major federal programs for the year ended June 30, 2011. EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs. Compliance with the requirements of laws, regulations, contracts, and grants applicable to each of its major federal programs is the responsibility of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s management. Our responsibility is to express an opinion on EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance based on our audit.

We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and OMB Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*. Those standards and OMB Circular A-133 require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion. Our audit does not provide a legal determination of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements.

In our opinion, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. complied, in all material respects, with the compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2011.

**Internal Control Over Compliance**

Management of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. is responsible for establishing and maintaining effective internal control over compliance with requirements of laws, regulations, contracts, and grants applicable to federal programs. In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance with the requirements that could have a direct and material effect on a major federal program to determine the auditing procedures for the purpose of expressing our opinion on compliance and to test and report on internal control over compliance in accordance with OMB Circular A-133, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance.

*A deficiency in internal control over compliance* exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. A *material weakness in internal control over compliance* is a deficiency, or combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over compliance that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over compliance that we consider to be *material weaknesses*, as defined above.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb + Troper LLP*

December 16, 2011

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

SCHEDULE OF FINDINGS AND QUESTIONED COSTS

YEAR ENDED JUNE 30, 2011

**Section I - Summary of Auditor's Results**

**Financial Statements**

Type of auditor's report issued: Unqualified

Internal control over financial reporting:

Material weakness(es) identified?	<u>          </u> yes	<u>  X  </u> no
Significant deficiency(ies) identified?	<u>          </u> yes	<u>  X  </u> none reported

Noncompliance material to financial statements noted?            yes   X   no

**Federal Awards**

Internal control over major programs:

Material weakness(es) identified?	<u>          </u> yes	<u>  X  </u> no
Significant deficiency(ies) identified?	<u>          </u> yes	<u>  X  </u> none reported

Type of auditor's report issued on compliance for major programs: Unqualified

Any audit findings disclosed that are required to be reported in accordance with Section 510(a) of Circular A-133?            yes   X   no

Identification of major program:

<u>CFDA Number</u>	<u>Name of Federal Program or Cluster</u>
Various	Research and Development Cluster

Dollar threshold used to distinguish between Type A and Type B programs:                     \$300,000                    

Auditee qualified as low-risk auditee?            yes   X   no

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF FINDINGS AND QUESTIONED COSTS**

**YEAR ENDED JUNE 30, 2011**

**Section II - Financial Statement Findings**

No matters were reported.

**Section III - Federal Award Findings and Questioned Costs**

No matters were reported.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**MANAGEMENT LETTER**

**JUNE 30, 2011**



**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

In planning and performing our audit of the financial statements of EcoHealth Alliance, Inc. (formerly known as Wildlife Trust, Inc.) and Wildlife Preservation Trust International, Inc. (EIIA) as of and for the year ended June 30, 2011 in accordance with auditing standards generally accepted in the United States of America, we considered EHA's internal control over financial reporting (internal control) as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EIIA's internal control. Accordingly, we do not express an opinion on the effectiveness of EHA's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A material weakness is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis.

Our consideration of internal control was for the limited purpose described in the first paragraph and was not designed to identify all deficiencies in internal control that might be deficiencies, significant deficiencies, or material weaknesses. We did not identify any deficiencies in internal control that we consider to be material weaknesses, as defined above.

This communication is intended solely for the information and use of management, the Board of Directors and others within EIIA, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Troper LLP*

December 16, 2011



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.  
CONSOLIDATED FINANCIAL STATEMENTS,  
AUDITOR'S REPORTS AND SCHEDULE  
RELATED TO OFFICE OF MANAGEMENT  
AND BUDGET CIRCULAR A-133  
JUNE 30, 2012**

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**TABLE OF CONTENTS**

**Independent Auditor's Report on Financial Statements  
and Schedule of Expenditures of Federal Awards**

**Exhibit**

**A - Consolidated Balance Sheet**

**B - Consolidated Statement of Activities**

**C - Consolidated Statement of Functional Expenses**

**D - Consolidated Statement of Cash Flows**

**Notes to Financial Statements**

**Schedule of Expenditures of Federal Awards**

**Notes to Schedule of Expenditures of Federal Awards**

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**TABLE OF CONTENTS  
(continued)**

**Independent Auditor's Report on Internal Control  
Over Financial Reporting and on Compliance and  
Other Matters Based on an Audit of Financial Statements  
Performed in Accordance with Government Auditing Standards**

**Independent Auditor's Report on Compliance  
with Requirements That Could Have a Direct and  
Material Effect on Each Major Program and on Internal  
Control Over Compliance in Accordance with OMB Circular A-133**

**Schedule of Findings and Questioned Costs**



**Independent Auditor's Report on Financial Statements  
and Schedule of Expenditures of Federal Awards**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

We have audited the accompanying consolidated balance sheet of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of June 30, 2012, and the related consolidated statements of activities, functional expenses and cash flows for the year then ended. These financial statements are the responsibility of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s management. Our responsibility is to express an opinion on these financial statements based on our audit. The prior year summarized comparative information has been derived from EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s June 30, 2011 financial statements and, in our report dated December 16, 2011, we expressed an unqualified opinion on those financial statements.

We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of June 30, 2012, and the changes in their net assets and their cash flows for the year then ended in conformity with accounting principles generally accepted in the United States of America.

In accordance with *Government Auditing Standards*, we have also issued our report dated January 31, 2013 on our consideration of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting and on our tests of their compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* and should be considered in assessing the results of our audit.

Our audit was conducted for the purpose of forming an opinion on the financial statements as a whole. The accompanying schedule of expenditures of federal awards is presented for purposes of additional analysis as required by U.S. Office of Management and Budget Circular A-133, *Audits of States, Local Governments and Non-Profit Organizations*, and is not a required part of the financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. The information has been subjected to the auditing procedures applied in the audit of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the schedule of expenditures of federal awards is fairly stated in all material respects in relation to the financial statements as a whole.



January 31, 2013

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**CONSOLIDATED BALANCE SHEET**

**JUNE 30, 2012 AND 2011**

	<u>2012</u>	<u>2011</u>
<b>ASSETS</b>		
Cash and cash equivalents	\$	(9,181)
Investments (Note 3)		
Contributions receivable (Note 4)		
Government contracts receivable - current		
Other receivable		
Prepaid expenses		
Security deposits		
Fixed assets - net (Note 5)		
Total assets	\$	
<b>LIABILITIES AND NET ASSETS</b>		
Liabilities		
Accounts payable and accrued expenses	\$	
Net assets (Exhibit B)		
Unrestricted		
Temporarily restricted (Note 8)		
Permanently restricted (Notes 8 and 12)		
Total net assets		
Total liabilities and net assets	\$	

See independent auditor's report.

The accompanying notes are an integral part of these statements.



ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

EXHIBIT B

CONSOLIDATED STATEMENT OF ACTIVITIES

YEAR ENDED JUNE 30, 2012

(With Summarized Financial Information  
for the Year Ended June 30, 2011)

	2012			2011
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
Operating revenues and other support				
Government contracts and grants				
Foundations - contributions				
Corporations - contributions (including in-kind contributions of (b)(4) in 2012) (Note 10)				
Bequests				
Individuals - contributions				
Special events				
Other revenues				
Net assets released from restrictions (Note 8)				
Total operating revenues and other support				

-continued-

ECOHEALTH ALLIANCE, INC. AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

EXHIBIT B

-2-

CONSOLIDATED STATEMENT OF ACTIVITIES

YEAR ENDED JUNE 30, 2012

(With Summarized Financial Information  
for the Year Ended June 30, 2011)

	2012			
	Unrestricted	Temporarily Restricted	Permanently Restricted	Total
				2011
Expenses (Exhibit C)				
Program service				
Research and education				
Supporting services				
Management and general				
Fund raising				
Direct costs of special events				
Total supporting services				
Total expenses				
Operating gain (loss)				
Nonoperating activities				
Investment income (Note 3)				
Disposition of restricted funds (Note 13)				
Change in net assets (Exhibit D)				
Net assets - beginning of year				
Net assets - end of year (Exhibit A)				

See independent auditor's report.

The accompanying notes are an integral part of these statements.

CONSOLIDATED STATEMENT OF FUNCTIONAL EXPENSES

YEAR ENDED JUNE 30, 2012  
(With Summarized Financial Information  
for the Year Ended June 30, 2011)

		Supporting Services			Total	
	Research and Education	Management and General	Fund Raising	Direct Costs of Special Events	Total	
						20122011
Salaries	\$	b(4)				
Payroll taxes and employee benefits						
Total salaries and related expenses						
Professional fees (Note 10)						
Subcontracts						
Grants to other organizations						
Field costs						
Meetings and conferences						
Travel and entertainment						
Occupancy (Note 9)						
Printing						
Postage						
Supplies						
Telephone						
Equipment						
Dues and subscriptions						
Repairs and maintenance						
Depreciation and amortization						
Catering and facility rental						
Information technology						
Bad debts						
Interest expense						
Investment expenses						
Miscellaneous						
Total other than salaries and related expenses						
Total expenses						
Less expenses netted against investment income						
Total expenses reported by function on the statement of activities (Exhibit B)	\$					

See independent auditor's report.

The accompanying notes are an integral part of these statements.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**CONSOLIDATED STATEMENT OF CASH FLOWS**

**YEARS ENDED JUNE 30, 2012 AND 2011**

	2012	2011
Cash flows from operating activities		
Change in net assets (Exhibit B)	\$ (0.04)	
Adjustments to reconcile change in net assets to net cash provided (used) by operating activities		
Depreciation and amortization		
Realized and unrealized gains on investments		
Decrease (increase) in assets		
Contributions receivable		
Government contracts receivable		
Other receivable		
Prepaid expenses		
Security deposits		
Increase (decrease) in liabilities		
Accounts payable and accrued expenses		
Refundable advances		
Net cash provided (used) by operating activities		
Cash flows from investing activities		
Proceeds from sale of investments		
Purchase of investments		
Net cash provided by investing activities		
Cash flows from financing activities		
Repayment of loan		
Net change in cash and cash equivalents		
Cash and cash equivalents - beginning of year		
Cash and cash equivalents - end of year	\$	
Supplemental disclosure of cash flow information		
Cash paid during the year for interest	\$	

See independent auditor's report.

The accompanying notes are an integral part of these statements.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 1 - ORGANIZATION AND TAX STATUS**

On June 22, 2010, Wildlife Trust, Inc. changed its name to EcoHealth Alliance, Inc.

EcoHealth Alliance, Inc. was incorporated on July 20, 2000 in the Commonwealth of Massachusetts. EcoHealth Alliance, Inc.'s mission is to integrate innovative science-based solutions and partnerships that increase capacity to achieve two interrelated goals: protecting global health by preventing the outbreak of emerging diseases and safeguarding ecosystems by promoting conservation.

EcoHealth Alliance, Inc. is funded primarily by contributions and government contracts and grants.

Wildlife Preservation Trust International, Inc. (WPTI) was incorporated on January 7, 1976 in the state of Pennsylvania. WPTI is a dormant corporation. In 2000, WPTI transferred the predominance of its assets to Wildlife Trust Inc., now known as EcoHealth Alliance, Inc.

EcoHealth Alliance, Inc. and WPTI are related through common control.

EcoHealth Alliance, Inc. and WPTI are exempt from federal income tax under Section 501(c)(3) of the Internal Revenue Code.

EcoHealth Alliance, Inc. and WPTI are collectively referred to as "EHA."

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

*Basis of accounting* - The financial statements are prepared on the accrual basis of accounting.

*Principles of consolidation* - All material intercompany transactions and balances have been eliminated in the consolidation.

*Use of estimates* - The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2012

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Cash and cash equivalents* - EHA considers highly liquid instruments purchased with original maturities of three months or less to be cash equivalents. EHA has periodically throughout the year maintained balances in various operating and money market accounts in excess of federally insured limits.

*Investments* - Investments are recorded at fair value. EHA invests in various investment securities. Investment securities are exposed to various risks such as interest rate, market and credit risks. Due to the level of risk associated with investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term, based upon the markets' fluctuations, and that such changes could materially affect EHA's financial statements.

*Contributions receivable* - Unconditional promises to give that are expected to be collected within one year are recorded at net realizable value. Unconditional promises to give that are expected to be collected in future years are recorded at the present value of their estimated future cash flows. The discounts on those amounts are computed using risk-adjusted interest rates applicable to the years in which the promises are received. Amortization of the discounts is included in contribution revenue. Conditional promises to give are not included as support until the conditions are subsequently met.

*Government contracts receivable* - Government contracts receivable are recorded when qualifying expenditures are incurred and EHA has a signed contract for services.

*Allowance for doubtful accounts* - EHA determines whether an allowance for uncollectibles should be provided for contributions and government contracts receivable. Such estimates are based on management's assessment of the aged basis of its contributions and other sources, current economic conditions and historical information. Contributions and government contracts receivable are written off against the allowance for doubtful accounts when all reasonable collection efforts have been exhausted.

*Fixed assets* - Fixed assets are recorded at cost and depreciated over their estimated useful lives using the straight-line method. Leasehold improvements are recorded at cost and are amortized over the shorter of the term of the lease or its estimated useful life using the straight-line method. Items with a cost of \$5,000 and an estimated useful life of more than one year are capitalized.

-continued-



ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2012

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Refundable advances* - Refundable advances consist of advances received on government contracts that are anticipated to be earned in the future.

*Net assets* - Unrestricted net assets include funds having no restriction as to use or purpose imposed by donors. Temporarily restricted net assets are those whose use has been limited by donors to a specific time period or purpose. Permanently restricted net assets have been restricted by donors to be maintained in perpetuity.

*Revenues from government agencies* - Revenues from government agencies are recognized when earned. Expense-based grants are recognized as allowable expenses are incurred. Performance-based grants are recognized as milestones are achieved.

*Contributed services* - Contributed services are recognized as revenue if the services create or enhance nonfinancial assets or require specialized skills, are provided by individuals possessing those skills, and typically need to be purchased if not provided by donation.

*Contributions* - Unconditional contributions, including promises to give cash and other assets, are reported at fair value at the date the contribution is received. Contributions are reported as either temporarily or permanently restricted support if they are received with donor stipulations that limit the use of the donated assets. When a donor restriction expires, that is, when a stipulated time restriction ends or purpose restriction is accomplished, temporarily restricted net assets are reclassified as unrestricted net assets and reported in the statement of activities as net assets released from restrictions.

*In-kind donations* - In-kind donations are recorded at fair value.

*Functional allocation of expenses* - The costs of providing EHA's programs and other activities have been summarized on a functional basis. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

*Rent expense* - EHA leases space at various locations. All leases are operating leases. Rent expense is recognized on the first day of each month for the current month's rent. All leases are reflected on the straight-line basis.

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

*Grants to other organizations* - EHA grants funds to charitable organizations for specific programs. Grants are recorded when approved by the EHA Board of Directors. Funds approved for payment are recorded as grants payable. As of June 30, 2012 and 2011, there were no outstanding grants payable.

*Subcontracted services* - Subcontracted services are recorded when services are incurred by the subcontractor. Advances to subcontractors are recorded as an asset. As of June 30, 2012 and 2011, there were no advances to subcontractors.

*Measure of operations* - EHA includes in its measure of operations all revenues and expenses that are an integral part of its program and supporting activities and excludes investment income and disposition of restricted funds.

*Prior-year summarized comparative information* - The financial statements include certain prior-year summarized comparative information in total but not by net asset class. Such information does not include sufficient detail to constitute a presentation in conformity with accounting principles generally accepted in the United States of America. Accordingly, such information should be read in conjunction with the financial statements for the year ended June 30, 2011, from which the summarized information was derived.

***Fair Value Measurements and Disclosures***

*Fair Value Measurements and Disclosures*, ASC Topic 820, establishes a framework for measuring fair value. The framework provides a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The hierarchy gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). The three levels of the fair value hierarchy are described below. Level 1 inputs to the valuation methodology are unadjusted quoted prices for identical assets or liabilities in active markets that EHA has the ability to access. Level 2 inputs to the valuation methodology include:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in inactive markets;
- Inputs other than quoted prices that are observable for the asset or liability;
- Inputs that are derived principally from or corroborated by observable market data by correlation or other means.

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES (continued)**

***Fair Value Measurements and Disclosures (continued)***

If the asset or liability has a specified (contractual) term, the Level 2 input must be observable for substantially the full term of the asset or liability. Level 3 inputs to the valuation methodology are unobservable and significant to the fair value measurement. The asset or liability's fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques used need to maximize the use of observable inputs and minimize the use of unobservable inputs.

The following is a description of the valuation methodology used for assets measured at fair value. There has been no change in the methodology used at June 30, 2012 as compared to 2011.

***Cash equivalents*** - Valued at the closing price reported on the active market on which the individual securities are traded.

***Government and government agency bonds, common stock, corporate bonds, U.S. Treasury bonds and notes, asset-backed bonds, and exchange-traded funds (ETFs)*** - Valued at the closing price reported on the active market on which the individual securities are traded.

The method described above may produce a fair value calculation that may not be indicative of net realizable value or reflective of future fair values. Furthermore, while EHA believes its valuation method is appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The assets at fair value as of June 30, 2012 and 2011 are set forth by level within the fair value hierarchy in Note 3.

***Uncertainty in income taxes*** - EHA has determined that there are no material uncertain tax positions that require recognition or disclosure in the financial statements. Periods ending June 30, 2009 and subsequent remain subject to examination by applicable taxing authorities.

***Subsequent events*** - Subsequent events have been evaluated through January 31, 2013, which is the date the financial statements were available to be issued.

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 3 - INVESTMENTS**

	<b>2012 (Level 1)</b>	<b>2011 (Level 1)</b>
Cash equivalents	\$ (b)(4)	
Corporate bonds		
Government and government agency bonds		
U.S. treasury bonds and notes		
Asset-backed bonds		
Common stock		
Basic materials		
Consumer discretionary		
Consumer staples		
Financial		
Healthcare		
Industrials		
Energy		
Information technology		
Conglomerates		
Consumer goods		
Services		
Equity exchange-traded funds (ETFs)		
Fixed-income ETFs		
	\$	

Investment income consists of the following:

	<b>2012</b>	<b>2011</b>
Interest and dividends	\$ (b)(4)	
Realized and unrealized gains on investments		
Investment fees		
	\$	

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 4 - CONTRIBUTIONS RECEIVABLE**

Contributions receivable are recorded at their net realizable value. These contributions have been discounted over the payment period using a discount rate of 2.5%. The contributions receivable are expected to be paid within the next three years.

2013	\$	(b)(4)
2014		
2015		
Less discount to present value		
Net	\$	

**NOTE 5 - FIXED ASSETS**

	2012	2011	Estimated Useful Lives
Office equipment	\$	(b)(4)	(b)(4)
Furniture and fixtures			
Leasehold improvements			
Accumulated depreciation and amortization			
Net	\$		

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 6 - LOAN PAYABLE**

On January 16, 2010, EHA established an unsecured line of credit with The Haverford Trust Company, enabling it to borrow from time to time an amount not exceeding (b)(4). The interest rate, based on the JP Morgan Chase Guaranty Prime Rate Floating Index, was (b)(4) at June 30, 2011. Interest expense for the year ended June 30, 2011 was (b)(4). The loan was paid off at December 31, 2010. The line of credit was extended for up to (b)(4) through January 13, 2015.

**NOTE 7 - PENSION**

EHA has a 403(b) defined contribution pension plan covering employees who meet age and length of service requirements. Pension expense was (b)(4) and (b)(4) for the years ended June 30, 2012 and 2011, respectively.

**NOTE 8 - TEMPORARILY AND PERMANENTLY RESTRICTED NET ASSETS**

Temporarily restricted net assets are available for the following purposes:

	2012	2011
Aquatics programs	\$ (b)(4)	
Conservation medicine field activities		
Gertrude Jasper Fund		
International training center		
Predict and prevent programs		
Ecohealth Alliance Partners		
	\$	

-continued-



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 8 - TEMPORARILY AND PERMANENTLY RESTRICTED NET ASSETS**  
(continued)

Temporarily restricted net assets have been released from restrictions by satisfying the following purposes:

	<u>2012</u>	<u>2011</u>
Aquatics programs		
Conservation medicine field activities	\$	
International training center		
Predict and prevent programs		
Program development		
Gertrude Jasper Fund		
Ecohealth Alliance Partners		
	\$	

Permanently restricted net assets are restricted to investments to be held in perpetuity. The investment income is available for the following purpose:

	<u>2012</u>	<u>2011</u>
Elephant conservation		

**NOTE 9 - OCCUPANCY**

In 2005, EHA entered into a ten-year and five-month lease for office space in New York. Rent for the first four (4) years will be (b)(4) annually, beginning five (5) months after commencement date. The annual fee for years five to seven shall be (b)(4) and for years eight through ten shall be (b)(4).

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 9 - OCCUPANCY (continued)**

Minimum lease payments are as follows:

2013	\$	(b)(4)
2014		
2015		
	\$	

Rent expense was (b)(4) and (b)(4) for the years ended June 30, 2012 and 2011, respectively.

**NOTE 10 - IN-KIND DONATIONS**

EHA received the following in-kind donations:

Public relations	\$	(b)(4)
Legal fees		
	\$	

**NOTE 11 - CONTINGENCIES**

EHA is subject to audits by funding sources. Management believes that the results of such audits, if any, will not have an adverse effect on the financial statements.

**NOTE 12 - ENDOWMENT FUNDS**

**General**

EcoHealth Alliance, Inc.'s endowment consists of a donor-restricted endowment fund established for elephant conservation (part of EcoHealth Alliance Partners). As required by GAAP, net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

-continued-

ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

JUNE 30, 2012

**NOTE 12 - ENDOWMENT FUNDS (continued)**

**Interpretation of Relevant Law**

The Board of Directors of EHA has adopted the New York Prudent Management of Institutional Funds Act (NYPMIFA). NYPMIFA moves away from the "historic dollar value" standard, and permits charities to apply a spending policy to endowments based on certain specified standards of prudence. EHA is now governed by the NYPMIFA spending policy, which establishes a maximum spending limit of (b)(4). As a result of this interpretation, EHA classifies as permanently restricted net assets (a) the original value of gifts donated to the permanent endowment, (b) the original value of subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable donor gift instrument at the time the accumulation is added to the fund. The remaining portion of the donor-restricted endowment fund that is not classified in permanently restricted net assets is classified as temporarily restricted net assets until those amounts are appropriated for expenditure by the organization in a manner consistent with the standards of prudence prescribed by NYPMIFA.

EcoHealth Alliance, Inc. has one donor-restricted endowment fund. The donor has opted not to conform with the new NYPMIFA guidelines and remains governed under the preexisting UMIFA.

**Return Objectives, Strategies Employed and Spending Policy**

The investment objective of EHA is to invest endowment funds in a manner to protect the purchasing power of the funds and to provide for growth. The investment policy to achieve this objective is to invest in publicly traded securities, government obligations and corporate bonds. Interest earned in relation to the endowment funds is recorded as temporarily restricted income and released from restriction upon expenditure for the program for which the endowment fund was established.

**Funds with Deficiencies**

There are no endowment funds with deficiencies.

**Endowment Net Asset Composition by Type of Fund as of June 30, 2012**

The endowment net asset composition of (b)(4) consists of (b)(4) of permanently donor-restricted funds and (b)(4) of accumulated earnings thereon, which are included as temporarily restricted funds.

-continued-



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO CONSOLIDATED FINANCIAL STATEMENTS**

**JUNE 30, 2012**

**NOTE 12 - ENDOWMENT FUNDS (continued)**

**Changes in Endowment Net Assets for the Year Ended June 30, 2012**

	<u>Temporarily Restricted</u>	<u>Permanently Restricted</u>	<u>Total</u>
Endowment net assets, beginning of year	\$	(b)(4)	
Interest and dividends			
Realized and unrealized losses			
Investment fees			
Appropriations			
Endowment net assets, end of year	\$		

**NOTE 13 - DISPOSITION OF RESTRICTED FUNDS**

In March 2012, EHA reached an agreement with Durrell Wildlife Conservation Trust on the disposition of two restricted funds: the Gertrude Jasper Fund and International Training Center, which had been held by EHA.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2012**

<u>Federal Grantor/Pass-through Grantor/Program or Cluster Title</u>	<u>Federal CFDA Number</u>	<u>Pass-through Entity Identification Number</u>	<u>Federal Expenditures</u>
<b><u>Research and Development Cluster</u></b>			
U.S. Department of Interior Fish and Wildlife Service Endangered Species Conservation - Recovery Implementation Funds	15.657		\$ 0.00
Total U.S. Department of Interior			
U.S. Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services	10.028		
Total U.S. Department of Agriculture			
National Science Foundation Social, Behavioral and Economic Sciences	47.075		
Biological Sciences Viral Pathogens EcohealthNet	47.074		
Pass-through from University of California-Santa Cruz		EF-0622391	
Total			
Total National Science Foundation			

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2012**

<u>Federal Grantor/Pass-through Grantor/Program or Cluster Title</u>	<u>Federal CFDA Number</u>	<u>Pass-through Entity Identification Number</u>	<u>Federal Expenditures</u>
<b><u>Research and Development Cluster (continued)</u></b>			
U.S. Department of Health and Human Services			
National Institute of Health			
Allergy, Immunology and Transplantation Research	93.855		\$ (b)(4)
Biomedical Research and Research Training	93.859		
Pass-through from Arizona State University		12-850	
Bushment Services	93.UNKNOWN		
The Ecology, Emergence and Pandemic Potential of NIPAH Virus in Bangladesh	93.UNKNOWN		
International Research and Research Training	93.989		
ARRA - Trans-NIH Recovery Act Research Support	93.701		
Total U.S. Department of Health and Human Services			
United States Agency for International Development			
Emerging Pandemic Threat Program	98.UNKNOWN		
Pass-through from University of California - Davis		N/A	
Total United States Agency for International Development			
Total Research and Development Cluster			
Total expenditures of federal awards			\$

See independent auditor's report.

The accompanying notes are an integral part of this schedule.



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2012**

**NOTE 1 - BASIS OF PRESENTATION**



The accompanying schedule of expenditures of federal awards (the "Schedule") includes the federal grant activity of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. under programs of the federal government for the year ended June 30, 2012. The information in this schedule is presented in accordance with the requirements of Office of Management and Budget (OMB) Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*. Because the Schedule presents only a selected portion of the operations of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc., it is not intended to and does not present the financial position, changes in net assets or cash flows of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.

**NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

Expenditures reported on the Schedule are reported on the accrual basis of accounting. Such expenditures are recognized following the cost principles contained in OMB Circular A-122, *Cost Principles for Non-Profit Organizations*, wherein certain types of expenditures are not allowable or are limited as to reimbursement. Negative amounts shown on the Schedule represent adjustments or credits made in the normal course of business to amounts reported as expenditures in prior years. Pass-through entity identifying numbers are presented where available.

**NOTE 3 - SUBRECIPIENTS**

Of the federal expenditures presented in the Schedule, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. provided federal awards to subrecipients as follows:

<u>CFDA Number</u>	<u>Program Name</u>	<u>Amount Provided to Subrecipient</u>
47.075	Social, Behavioral and Economic Services	\$ 
93.855	Allergy, Immunology and Transplantation Research	

-continued-

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**NOTES TO SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS**

**YEAR ENDED JUNE 30, 2012**

**NOTE 3 - SUBRECIPIENTS (continued)**

<u>CFDA Number</u>	<u>Program Name</u>	<u>Amount Provided to Subrecipient</u>
93.859	Biomedical Research and Research Training	\$ (b)(4)
93.989	International Research and Research Training	
93. UNKNOWN	The Ecology, Emergence and Pandemic Potential of NIPAH Virus in Bangladesh	
98.UNKNOWN	Emerging Pandemic Threat Program	
93. UNKNOWN	Bushment Services	
	Total	\$





**Independent Auditor's Report on  
Internal Control Over Financial Reporting  
and on Compliance and Other Matters  
Based on an Audit of Financial Statements Performed  
in Accordance with Government Auditing Standards**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

We have audited the financial statements of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. as of and for the year ended June 30, 2012, and have issued our report thereon dated January 31, 2013. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States.

**Internal Control Over Financial Reporting**

Management of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. is responsible for establishing and maintaining effective internal control over financial reporting. In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over financial reporting.

*A deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. *A material weakness* is a deficiency, or combination of deficiencies, in internal control such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis.

Our consideration of internal control over financial reporting was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over financial reporting that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over financial reporting that we consider to be material weaknesses, as defined previously.

**Compliance and Other Matters**

As part of obtaining reasonable assurance about whether EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s financial statements are free of material misstatement, we performed tests of their compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit and, accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Troper LLP*

January 31, 2013





**Independent Auditor's Report on Compliance with  
Requirements That Could Have a Direct and Material Effect on  
Each Major Program and on Internal Control Over Compliance  
in Accordance with OMB Circular A-133**

**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

**Compliance**

We have audited EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with the types of compliance requirements described in the *OMB Circular A-133 Compliance Supplement* that could have a direct and material effect on each of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s major federal programs for the year ended June 30, 2012. EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs. Compliance with the requirements of laws, regulations, contracts, and grants applicable to each of its major federal programs is the responsibility of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s management. Our responsibility is to express an opinion on EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance based on our audit.

We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and OMB Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*. Those standards and OMB Circular A-133 require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion. Our audit does not provide a legal determination of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s compliance with those requirements.

In our opinion, EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. complied, in all material respects, with the compliance requirements referred to above that could have a direct and material effect on each of its major federal programs for the year ended June 30, 2012.

### Internal Control Over Compliance

Management of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc. is responsible for establishing and maintaining effective internal control over compliance with requirements of laws, regulations, contracts, and grants applicable to federal programs. In planning and performing our audit, we considered EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance with the requirements that could have a direct and material effect on a major federal program to determine the auditing procedures for the purpose of expressing our opinion on compliance and to test and report on internal control over compliance in accordance with OMB Circular A-133, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of EcoHealth Alliance, Inc. and Wildlife Preservation Trust International, Inc.'s internal control over compliance.

*A deficiency in internal control over compliance* exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. *A material weakness in internal control over compliance* is a deficiency, or combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over compliance that might be deficiencies, significant deficiencies or material weaknesses. We did not identify any deficiencies in internal control over compliance that we consider to be *material weaknesses*, as defined above.

This report is intended solely for the information and use of management, the Board of Directors, others within the entity, federal awarding agencies and pass-through entities, and is not intended to be and should not be used by anyone other than these specified parties.



January 31, 2013



**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF FINDINGS AND QUESTIONED COSTS**

**YEAR ENDED JUNE 30, 2012**

**Section I - Summary of Auditor's Results**

**Financial Statements**

Type of auditor's report issued: Unqualified

Internal control over financial reporting:

Material weakness(es) identified?            yes     X     no

Significant deficiency(ies) identified?            yes     X     none reported

Noncompliance material to financial statements noted?            yes     X     no

**Federal Awards**

Internal control over major programs:

Material weakness(es) identified?            yes     X     no

Significant deficiency(ies) identified?            yes     X     none reported

Type of auditor's report issued on compliance  
for major programs: Unqualified

Any audit findings disclosed that are required to be reported  
in accordance with Section 510(a) of Circular A-133?            yes     X     no

Identification of major program:

<u>CFDA Number</u>	<u>Name of Federal Program or Cluster</u>
--------------------	---

Various	Research and Development Cluster
---------	----------------------------------

Dollar threshold used to distinguish between  
Type A and Type B programs:

\$300,000

Auditee qualified as low-risk auditee?

    X     yes            no

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**SCHEDULE OF FINDINGS AND QUESTIONED COSTS**

**YEAR ENDED JUNE 30, 2012**

**Section II - Financial Statement Findings**

No matters were reported.

**Section III - Federal Award Findings and Questioned Costs**

No matters were reported.

**ECOHEALTH ALLIANCE, INC.  
AND  
WILDLIFE PRESERVATION TRUST  
INTERNATIONAL, INC.**

**MANAGEMENT LETTER**

**JUNE 30, 2012**



**Board of Directors  
EcoHealth Alliance, Inc. and  
Wildlife Preservation Trust International, Inc.**

In planning and performing our audit of the financial statements of EcoHealth Alliance, Inc. (formerly known as Wildlife Trust, Inc.) and Wildlife Preservation Trust International, Inc. (collectively "EHA") as of and for the year ended June 30, 2012 in accordance with auditing standards generally accepted in the United States of America, we considered EHA's internal control over financial reporting (internal control) as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of EHA's internal control. Accordingly, we do not express an opinion on the effectiveness of EHA's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements on a timely basis. A material weakness is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected on a timely basis.

Our consideration of internal control was for the limited purpose described in the first paragraph and was not designed to identify all deficiencies in internal control that might be deficiencies, significant deficiencies, or material weaknesses. We did not identify any deficiencies in internal control that we consider to be material weaknesses, as defined above.

This communication is intended solely for the information and use of management, the Board of Directors and others within EHA, and is not intended to be and should not be used by anyone other than these specified parties.

*Loeb & Tropa LLP*

January 31, 2013

EcoHealth Alliance  
Finance Policies and Procedures Manual

Revised January 1, 2010

EcoHealth Alliance  
Accounting Policies and Procedures Manual  
Table of Contents

Introduction	3
General Statements	3
Division of Responsibilities	6
Cash Receipts Procedures	8
Cash Disbursements Procedures	10
Reconciliations	11
Petty Cash Fund	13
Purchases	14
Fixed Asset Management	14
Contractual Services	15
Payroll	16
Financial Reporting	17
Grant Management and Compliance	19
Computer System Backup Procedures	22
Fiscal Policy Statements	22
Travel Policy and Procedure	Appendix A
Record Retention	Appendix B
Filing Procedures	Appendix C
Revisions	



## **Introduction**

This manual has been prepared to document the internal accounting procedures for ECOHEALTH ALLIANCE. Its purpose is to ensure that assets are safeguarded, that financial statements are in conformity with generally accepted accounting principles, and that finances are managed with responsible stewardship.

All personnel with a role in the financial management of ECOHEALTH ALLIANCE' are expected to uphold the policies in this manual. It is the intention of ECOHEALTH ALLIANCE that this accounting manual serve as our commitment to proper, accurate financial management and reporting.

EcoHealth Alliance management at all levels are responsible for safeguarding financial and physical assets and being alert to possible exposures, errors and irregularities. Management must be aware of internal control weaknesses which can lead to or permit misuse, misappropriation, or destruction of assets. EcoHealth Alliance policy regarding the safeguarding of assets and the investigating, processing, and reporting of suspected misappropriations and similar irregularities applies to all areas of risk involved in program and administrative operations.

## **General Statements**

### **Role of the Finance Department**

The Finance Department is responsible for accounting for EcoHealth Alliance's financial activity in accordance with Generally Accepted Accounting Principles (GAAP). Financial activity includes all program, development and administrative operations.

1. Accounts will be maintained and reports prepared on the accrual basis of accounting.
2. Revenues will be recorded when earned.
3. Expenditures will be recorded when materials or services are received or when an obligation or the impairment of an asset has occurred.
4. The Finance Department is responsible for maintaining a system of internal controls adequate to safeguard EcoHealth Alliance assets.

### **General Principles**

The primary purpose of MIP, "the accounting software" is to assist EcoHealth Alliance to account for resources in accordance with objectives established by the Board of Directors, management, donors, government agencies or others. These objectives include, but are not limited to:

1. Maintaining the financial accounting and budgeting system in accordance with the principles of GAAP fund accounting.
2. Ensuring that net assets that are not subject to donor-imposed restrictions will be accounted for as unrestricted net assets.

R2 5/12/2010

3. Ensuring that net assets that are subject to legal or donor-imposed restrictions that will be met by actions of EcoHealth Alliance and/or the passage of time will be accounted for as temporarily restricted net assets. These net assets include gifts donated for specific purposes and capital appreciation on permanent endowment, which is restricted by New York State law on the amounts that may be expended in a given year.
4. Ensuring that net assets that are subject to donor-imposed restrictions that require the original contribution be maintained in perpetuity by EcoHealth Alliance, but that permit the use of the investment earnings for general or specific purposes, will be accounted for as permanently restricted net assets.
5. Recording and reporting expenses as a decrease in unrestricted net assets.
6. Properly recording Gains and losses on investment as increases or decreases in unrestricted net assets unless their use is restricted by explicit donor stipulation or by law.
7. Recording and reporting the expiration of temporary restrictions as net assets released from restrictions from temporarily restricted to unrestricted net assets.
8. Recording resources held by the EcoHealth Alliance as custodian or fiscal agent for others will be accounted for as EcoHealth Alliance funds and shown as a liability on the Statement of Position.

#### Management of the Accounting Software

Maintenance of MIP, the financial accounting system is necessary to ensure financial accounting and reporting integrity.

1. The Finance Department is responsible for the maintenance of MIP. The number of accounts will be limited to a level necessary to ensure the efficient operation of EcoHealth Alliance unless required by specific agreements. All requests to create new accounts (departments, projects, funding sources, general ledger) must be accompanied by proper documentation and approved by the Chief Financial Officer
2. Accounts will be established in appropriate fund groups to reflect the nature of the revenues to be generated and/or the purpose of the expenditures to be incurred as defined by GAAP procedures.
3. All changes to account purpose codes and other account specific information must be approved by the Chief Financial Officer.
4. Departments are required to notify the Finance Department, on a timely basis, of any organizational change affecting reporting responsibility.

#### Revenue Recognition Policy

Revenue should be recognized based on accrual accounting in accordance with GAAP. Revenue should be recognized when it has been earned, regardless of the timing of cash receipts. Revenue is considered earned when EcoHealth Alliance has substantially met its obligation to be entitled to the benefits represented by the revenue. Deposits and contractual advances (whether refundable or non-refundable), early payments and progress payments should not be recognized as revenue until the revenue producing event has occurred.

#### Deferred revenue

Deferred revenue results when cash is received in advance of revenue being earned. Deferred revenue is a liability on the Statement of Position until it is earned. Once earned, the liability is reduced and revenue is recorded in the Statement of Activities. When recording cash receipts, it is important to determine whether the cash represents payments for recognized revenue or for deferred revenue.

#### Accruals and cutoff

Revenue should be recognized in the period in which it was earned regardless of the timing of billing. At the end of each month, revenue that has been earned but not billed or received should be accrued and recorded as revenue in that month. An asset (accounts receivable) is recognized on the Statement of Position for the revenue that has been earned but not billed or for which payment has not been received.

#### Invoicing and cash receipt

Invoice processing and cash receipts may or may not occur at the same time. Revenue should be recognized when earned, while invoicing and cash receipt may occur independently of the earning process. For example, cash may be received prior to the performance of a service or recognition of any expense. When cash is received in advance, cash is recorded and a deferred revenue liability is recorded. Revenue is not recognized until the performance of the service or sale is complete. Conversely, if a service has been completed, revenue should be recorded whether or not billing has occurred or payment has been received.

#### Program revenues

Program revenue includes direct revenue and indirect cost recovery earned under grants from governmental and private sponsors. Government program revenues received by EcoHealth Alliance are primarily cost reimbursement grants and contracts. These contracts reimburse expenses that have already been incurred and revenues are directly related to the costs incurred. Government program revenue is recognized as expenses are incurred. Adjustments to expense under such programs result in an adjustment to revenue.

Payments received in advanced from government grants and contracts are reported as deferred income on the Statement of Position until such time as the revenue has been earned, which is when the expense is incurred.

#### Contributions

Contributions are unconditional transfers of cash or other assets to EcoHealth Alliance or a settlement or cancellation of its liabilities in a voluntary nonreciprocal transfer by another entity acting other than as an owner. Other assets include securities, land, buildings, use of facilities or utilities, material and supplies, intangible assets, services and unconditional promises to give those items in the future.

Contributions, including unconditional promises to donate, are recognized as revenue in the period received. Unconditional promises to donate, or pledges, are recognized at their estimated net present value, net of an allowance for uncollectible amounts and are classified in the appropriate net asset category. Pledges and contributions of cash and other assets designated for the acquisition of long-lived assets and long-term investment

are reported with Non-operating revenue, net gains, reclassifications and other on the Statement of Activities.

Contributions subject to donor-imposed restrictions that will be met by actions of EcoHealth Alliance and/or the passage of time are included in temporarily restricted net assets on the Statement of Activities. Contributions with donor-imposed restrictions that require the original contribution be maintained in perpetuity by the University are included in permanently restricted net assets on the Statement of Activities.

#### Other Income

Other income includes revenues that are related incidentally to the conduct of EcoHealth Alliance activities. Other income revenue is recognized when earned, that is, at the time goods or services are provided.

#### Gifts of securities

Gifts of securities will be valued and recorded at the mean of the high and low price as published by the Wall Street Journal or other publication when received by EcoHealth Alliance. The date of gift is determined as the date the security is transferred to EcoHealth Alliance. Gifts of securities are to be sold as soon as all appropriate restrictions are lifted. Gifts of the securities are not held for investment. All market or appraised values assigned to gifts of securities must be properly supported in accordance with Internal Revenue Service regulations.

#### External Financial Relationships

The Chief Financial Officer is responsible for the efficient operations of EcoHealth Alliance's financial relationships.

The Chief Financial Officer of EcoHealth Alliance is responsible for initiating and executing all transactions with banking and other financial institutions. This includes any bank accounts, external financing arrangements (loans, letters of credit), safekeeping agreements (securities, safe deposit boxes) and receipt processing arrangements (lockboxes).

All bank accounts and similar arrangements with banks and other financial institutions must be approved by the Board of Directors of EcoHealth Alliance. All disbursements from EcoHealth Alliance accounts must be approved by the Chief Financial Officer. Signing authority is determined by the Board of Directors

### **Division of Fiscal Responsibilities**

The following is a list of key personnel who have responsibilities within the accounting department:

#### Chief Financial Officer:

1. Establishes fiscal policies and procedures consistent with the mission of EcoHealth Alliance, directives from the Board, and appropriate laws and regulations.
2. Approves all vouchers, invoices and checks disbursements and wire transfer of

funds.

3. With input from the President and Program Directors, develops the annual budget.
4. Reviews and approves all financial reports.
5. Manages the relationship with external fiscal organizations (bank, investment management firm, independent auditor).
6. Reviews the payroll summary for the correct payee, hours worked and check amount.
7. Approves all contracts with outside vendors

Accounting and Grants Manager:

1. Maintains and reconciles the general ledger monthly
2. Records the payroll in the general ledger and allocates payroll to proper projects and funding sources.
3. Ensures that all employees have completed and filed their monthly timesheet
4. Reconciles the IRS 941 to the general ledger each quarter
5. Prepares schedules for the annual audit.
6. Reconciles the bank accounts.
7. Prepare annual 1099 for vendors
8. Record all activities for investment accounts
9. Review all journal entries for accuracy prior to posting.

Business Manager

1. Records outbound wire transfers in the general ledger
2. Maintains and distributes log of pending outbound wire transfers
3. Review and approves operating expense invoices.
4. Maintains cash disbursement and credit card activity
5. Manages the petty cash fund.

Assistant Business Manager:

1. Open and distribute all mail.
2. Make copies of checks for Foundations, Development, Marketing (License Income) and Any Reimbursements, or income for scientist's projects, give copy to appropriate scientist or assistant, and keep one for finance records.
3. File Merchant Financial Statements in appropriate binder.
4. File Wachovia Transaction Notifications in appropriate binder.
5. Give Insurance forms to Chief Financial Officer.
6. File company stocks/investments in appropriate binders and notify Accounting and Grants Manager.
7. Give Charitable Registration forms to Business Manager or Chief Financial Officer.
8. Give Visa Statements to Business Manager.
9. File paid invoices under proper vendor in filing cabinet.
10. File Cash Receipts by Month in filing cabinet.
11. Divide Filing Records into separate Fiscal Years.

## **CASH RECEIPTS PROCEDURES**

### **Receipt of Cash**

1. The Assistant Business Manager may occasionally receive cash in the mail.
2. All cash that is received must be declared and presented to the Chief Financial Officer.
3. Two people must be present when counting the cash.

The Assistant Business Manager receives all incoming mail. The checks and cash are then sorted from the rest of the mail. All checks should be endorsed with EcoHealth Alliance stamp with account number and the wording "For deposit only" then, photocopied. All cash received are recorded on a cash receipt voucher/form that list the donor, amount and the date received that could be sent to the donor if requested. The deposit slips are prepared and the Assistant Business Manager is responsible to make all bank deposits. The bank stamped deposit slip is then attached to the applicable check copies and cash receipt voucher. All receipts are entered into the accounting system (MIP). All records are then filed chronologically by date and month.

### **Cash Receipt Procedure:**

1. Make copies of checks on the day they are received.
2. Date Stamp Check copies to record Date of Receipt.
3. Record Checks with proper coding into MIP Accounting (Cash Receipt Session).
4. Make a Bank Deposit at least once a week or more often when necessary

### **Making a Deposit:**

1. Run a report: Go into Reports- Transaction Reports- Unposted General Ledger Transactions; Report name is KP Deposit; Select filter- Make sure you have the right session ID number selected, and the correct Document Number, print out the report.
2. Write out a Deposit Slip and enter check amounts into an Excel Document to double check the amount with the Report.
3. "Deposit Stamp" the checks and go to the bank.
4. Place the deposit ticket receipts with the report and check copies, then give this all to the Accounting and Grants Manager to double check against the bank statement and ledger, once he has checked it he will give it back to you and you can file it.

### **Pledges:**

1. Record Pledges into a Journal Voucher session in MIP Accounting.
2. Once the money is received; record the amount in a Cash Receipts Session in MIP.
3. File the original pledge with the received check or credit card receipt.

### **Credit Card Procedures:**

1. Enter Credit Cards as they are received. Import them into MIP in a monthly Cash Receipts Session labeled "Inbound Credit Cards". Receipt number should be the date the credit card was processed.



2. For Gala Payments; make a copy of the approved credit card receipt for the Vice President of External Relations and file a copy in the Credit Card Binder.
3. For Ecohealth Payments; file receipts in Credit Card Binder by month.

Credit Card Processing:

- a. Enter Sale – key in credit card number
- b. Enter Expiration Date
- c. Card Present – Press 'No'
- d. Amount – Enter donation Amount
- e. Order will process – If the order does not go through, call terminal support, otherwise you may have an invalid card number or the card may be expired. In this case let the appropriate person know, so they may get a better card number.
- f. NOTE: you do not need to enter the zip code or address, or the security code unless prompted by the machine.

For Kintera fees:

Enter Cash Receipt session in MIP. Debit to expense and credit to cash. For both instances the balance in the top box is a negative number.

For entering credits:

Create new API session for every time a new credit comes in.  
Post after you have entered the credit in the new API session

Invoices:

- Enter approved invoices into a MIP API session. Double check with the Business Manager to ensure that there are no false charges.
- Enter correct effective date and due date. Double check by searching through Vendor reports in MIP. Insurance and standard bills should be entered once a month.
- Post API session and select invoices to Pay. Grab checks in locked File Cabinet and print out checks by selecting "Pay Selected AP Invoices" in MIP.
- Give checks to Chief Financial Officer to sign.
- Mail out payments to appropriate vendors. To be done twice weekly.

Reconciliation with Development:

- A monthly Expanded General Ledger Report should be printed out every month to double check revenues listed in Donor Perfect.
- Use original invoice number, enter credit and debit to cash.
- Check in invoices to pay to make sure the unpaid balance is decreasing

#### Receipts by Wire Transfer

The Assistant Business Manager receives memos for incoming wire transfers and matches them to the form received from the Chief Financial Officer (CFO). The form from the CFO lists the funding source and the project which is then entered into MIP (Accounting system). All incoming wire transfer records should be filed chronologically in a separate folder for each fiscal year. Also, if applicable, a copy of the wire transfer should be cross referenced to the funding source contract file.

The Fiscal/Accounting Manager reconciles these credit memos to the total cash received at the end of the month.

#### Funds received from Merchant Card Charges:

1. The Assistant Business Manager handles all merchant credit card orders dealing with Gala/Event Payments and Magazine Subscription Orders.
2. Merchant Card orders are entered as they are received. They should be imported into MIP Accounting in a monthly Cash Receipts Session labeled "Inbound Merchant Cards". The receipt number should be the date the credit card was processed.
3. A totals report should be conducted every Friday when the Merchant Card Machine is settled.
4. All Merchant Card receipts are to be organized in a Credit Card binder.

### **CASH DISBURSEMENT PROCEDURES**

#### Disbursements by Check:

All check request forms are submitted to the CFO for approval. The CFO shall review the invoice for approval by the program manager or their designate, that services have been provided pursuant to an approved contract, and the invoice has been charged to the proper account.

All approved check requests are submitted to the Assistant Business Manager to process which includes:

1. Find and or set up vendor record
2. Create an Accounts Payable Invoice
3. Process checks for Account Payable Invoice and submit check to CFO for signature.
4. All checks are then mailed to the vendors, etc., by the Assistant Business Manager.

#### Disbursements Wire Transfer:

All requests for the wire transfer of funds are given to the Business Manager who will  
R2 5/12/2010

record the transaction into a reporting log. The Business Manager will review the request to ensure the proper account coding and will ascertain that there are sufficient funds available for the transfer.

The CFO will review the requests for wire transfer and process the payment through the banks on-line cash management facility. The completed request will be stamped "PAID" with the date of the transaction. The completed bank transaction report will be attached to the request and filed appropriately.

## **Reconciliations**

### **Bank Account Reconciliation**

The Accounting and Grants Manager is the position charged with the responsibility to reconcile each account promptly upon receipt of the appropriate monthly statement.

All accounts will be reconciled no later than 7 days after receipt of the monthly statement. In the event it is not possible to reconcile the bank statements in this period of time, the Chief financial Officer should be notified by a written memo.

When reconciling the bank accounts, the following items should be included in the procedures:

- a. A comparison of dates and amounts of daily deposits as shown on the bank statements with the cash receipts journal.
- b. A comparison of inter-organization bank transfers to be certain that both sides of the transactions have been recorded on the books.
- c. An investigation of items rejected by the bank, i.e., returned checks or deposits.
- d. A comparison of wire transfers dates received with dates sent.
- e. A comparison of canceled checks with the disbursement journal as to check number, payee and amount.
- f. An accounting for the sequence of checks both from month to month and within a month.
- g. An examination of canceled checks for authorized signatures, irregular endorsements, and alterations.
- h. A review and proper mutilation of void check.
- i. Investigate and write off checks which have been outstanding for more than six months.

Completed bank reconciliations should be reviewed by the Chief Financial Officer and initialed dated by the reviewer. The Fiscal Manager upon receipt of the completed bank reconciliations prepares any general ledger adjustments.

### **Investment Account Analysis**

R2 5/12/2010

An analysis of the investment account is completed by the Accounting and Grants Manager at the end of each month. The investment statement is compared with the investment general ledger account balances and records in MIP all entries for monthly activities which include the following:

1. Interest and dividends earned
2. Realized gain and losses
3. Unrealized gain and losses
4. Commission and fees applied; and,
5. Fund transfers

Reconciliations of Other General Ledger Accounts:

Each month the Chief Financial Officer and the Accounting and Grants Manager should review the ending balance shown on balance sheet accounts such as the cash accounts, accounts receivable, accounts payable and deferred revenue. The review should include the bank reconciliations, schedules of accounts receivable and deferred revenue and the aging of accounts payable to support the balances shown on the balance sheet.

**Assets**

- a. Cash - The balances in cash accounts should agree with the balances shown on the bank reconciliations for each month.
- b. Petty Cash - The balance in this account should always equal the maximum amount of all petty cash funds. The current amount equals \$100.00.
- c. Pre-paid Expense - The amounts in these accounts should equal advance payments paid to vendors at the end of the accounting period.
- d. Property, Equipment & Fixtures - The amounts in this account should equal the totals generated from the audited depreciation schedules. When additional purchases are made during the year, the balances in the accounts may be updated accordingly.
- e. Security Deposits - The balance in this account should equal amounts paid in escrow to landlords and lessors and should not change frequently, but should be updated as applicable.

**Liabilities -**

- a. Accounts Payable - The balance in this account should equal amounts owed to vendors at the end of the accounting period and the aging report.
- b. Payroll Liabilities - The amounts in these accounts should equal amounts withheld from employee paychecks as well as the employers' portion of the expense for the period that has not been remitted to other entities.

**Income/Expenses**

- a. Income - The amounts charged to the various cash accounts should be reconciled with funding requests, funder's reports, draw down schedules, etc.
- b. Gross Salary Accounts - The balances in the gross salary accounts should be added together and reconciled with the amounts reported on quarterly payroll returns.

- c. Consulting - The amounts charged should be reconciled to the contracts.

#### Development Income

The Assistant Business Manager and the Administrative Assistant for External Relations will reconcile the receipts and pledges recorded in MIP to the amounts recorded in Donor Perfect.

#### Petty Cash Fund

1. The petty cash fund should never exceed \$200.00.
2. The Business Manager is the custodian of the petty cash fund.
3. A single disbursement from petty cash shall never exceed \$25.00.
4. The petty cash fund shall be operated on an impress basis. This means that when it is time to replenish the petty cash fund, the Business Manager shall total out the expenses made and identify those expenses by general ledger account number. When the check request is submitted for payment it should indicate the total amount needed to bring the fund back up to \$200.00. Also, the check request should breakdown the various expense accounts being charged and the amount charged to each.
5. When a request for petty cash reimbursement is made to the Business Manager, the item will be listed on the Petty Cash Fund Reconciliation Sheet. A description of the item charged should be recorded together with the amount. A vendor receipt must be received by the Business Manager for the amount of the request in order for the request to be approved.
6. The recipient of the petty cash funds must sign the sheet to indicate receipt of the funds. The paid receipt should be attached to the sheet. All paid information should remain in the locked petty cash box until it is time to replenish the fund. At that time, the Petty Cash Fund Reconciliation Sheet and associated receipts are attached to the check request voucher.
7. The petty cash box is to be locked at all times when the Business Manager is not disbursing or replenishing the fund. The locked petty cash box is to be kept in the locked file cabinets within the finance office.
8. At least once annually, the CFO should conduct a surprise review of the fund. When this is done, he/she should count, while the Business Manager is in attendance, the total monies on hand and the total amount of receipts in the petty cash box. The two amounts should equal exactly \$200.00. Any discrepancies should be discussed and resolved immediately.
9. It is a policy of ECOHEALTH ALLIANCE not to cash checks of any kind through the petty cash fund.
10. ECOHEALTH ALLIANCE postage is not to be used for personal mailings under any circumstances. Staff may use the UPS service provided they indicate that the mailing is personal and reimburse ECOHEALTH ALLIANCE at the time the appropriate invoice is paid.

#### Purchases

R2 5/12/2010



To Prompt a Purchase:

1. Program unit managers, or their approved designee, may order supplies and services from vendors provided there are adequate funds available in their approved grants and the spending authority has been approved in the EcoHealth Alliance budget.
2. Other unit managers, or their approved designee, may order supplies and services from vendors provided there are adequate funds available and the spending authority has been approved in the EcoHealth Alliance budget.

Credit Card Purchases: (See Appendix A)

**FIXED ASSET MANAGEMENT**

Capital Expenditures

For all major expenditures such as computers, furniture, audit services, printing services, etc., three bids must be obtained before a purchasing decision is made. If the annual amount will exceed \$5,000, a bidding process and review will be conducted. All bids, including phone quotes, must be recorded and kept on file.

Consultants:

Contracts with consultants will include rate and schedule of pay, deliverables, time frame, and other information such as work plan, etc. Justification for payment should be submitted to file. For example, if ECOHEALTH ALLIANCE hired a writer to create a publication, a copy of the final version should be included in the file.

Contracts:

Contracts for purchasing products or services, similar to a purchase order, should be created and maintained for the file whenever appropriate. All contracts to exceed \$10,000 over the course of the year should be approved by the President.

1. A permanent property log or database is to be maintained by the Fiscal Manager for all fixed assets purchased by ECOHEALTH ALLIANCE.
2. The log should contain the following information:
  - a. date of purchase
  - b. description of item purchased
  - c. received by donation or purchased
  - d. cost or fair market value on the date receipt
  - e. donor or funding source, if applicable
  - f. funding source restrictions on use or disposition
  - g. identification/serial number (if appropriate)
  - h. depreciation period
  - i. vendor name and address

- j. warranty period
  - k. inventory tag number (all fixed assets should be tagged with a unique identifying number)
  - l. number of the ECOHEALTH ALLIANCE check used to pay for the equipment
3. At least annually, a physical inspection and inventory should be taken of all ECOHEALTH ALLIANCE fixed assets and reconciled to the general ledger balances. Adjustments for dispositions should be made.
  4. The Fiscal Manager should be informed, in writing, via an interoffice memorandum of any material changes in the status of property and equipment. This should include changes in location, sale of, scrapping of and/or obsolescence of items and any purchase or sale of real estate.
  5. All capital items which have a cost greater than \$5,000.00 will be capitalized and depreciated.

## **CONTRACTUAL SERVICES**

### **Independent Contractors**

Funds disbursed to all independent contractors shall be in accordance with an Independent Contractor agreement signed by the contractor and the President of EcoHealth Alliance. The contract shall specify the scope of services, the rate and timing of payments, and other related business terms.

Independent contractors must complete IRS form W-9 before any disbursements shall be made.

The contractor shall periodically invoice EcoHealth Alliance for services rendered. The invoice shall be reviewed and approved by the appropriate unit head and sent to the Finance Unit for payment.

All independent contractor contracts must be developed in accordance with the EcoHealth Alliance budget and, if applicable, grant award budgets. Contracts must be presented to the President of EcoHealth Alliance for review and signature.

### **Contracts with Other Organizations**

Funds disbursed to outside organizations for services or as pass-through payments shall be in accordance with a contractual agreement signed by a representative of the organization and the President of EcoHealth Alliance. The contract shall specify the scope of services, the rate and timing of payments, and other related business terms.

The appropriate unit head or their designee shall issue a signed request to disburse pass-through funds to the contracting organization. Invoices for services rendered shall be reviewed and approved by the appropriate unit head and sent to the Finance Unit for payment.

Pass-through funds must have been received by EcoHealth Alliance before they can be disbursed to any organization.

All contracts with other organizations must be developed in accordance with the EcoHealth Alliance budget and, if applicable, grant award budgets. Contracts must be presented to the President of EcoHealth Alliance for review and signature.

## **Payroll**

### Personnel:

1. The CFO is charged with the responsibility of maintaining personnel files on staff persons.
2. Each personnel file should contain the following information, at a minimum.
  - a. Employment application or resume
  - b. A record of background investigation
  - c. Date of employment
  - d. Position, pay rates and changes therein
  - e. Authorization of payroll deductions
  - f. Earnings records for non-active employees
  - g. W-4 Form, withholding authorization
  - h. I-9 Immigration Form
  - i. Termination data, when applicable
3. All personnel records are to be kept locked in a locking file cabinet. Access to these files other than by the CFO or the auditor should be requested in writing to the President.

### Timekeeping:

1. Timesheets are to be prepared by all staff persons and monthly on the 5th business day of succeeding month. Time should be input on a daily basis and, if in writing, completed in ink. Correction fluid should never be used in preparing timesheets. If an error needs to be corrected, a line should be drawn through the item and the corrected information recorded, and initialed by the person who made the correction.
2. Timesheets are to include specific time spent on each project/funding source.
3. Timesheets are to be signed by the staff person or, if that is not feasible, their supervisor in accordance with OMB Circular A-133.
4. All approved timesheets should be submitted to the Accounting Manager.
5. Payroll information and paychecks should be distributed by the CFO on the designated day.

6. As an employee benefit, ECOHEALTH ALLIANCE offers direct deposit through the employee's own financial institution. Through direct deposit, payroll is deposited as cash into the employee's account on payday.

### **Financial Reporting**

#### Monthly Reports:

The CFO prepares monthly financial reports for distribution to the President and the Finance Committee (FINCO). The reports should include: a consolidated income and expense report that shows budget-to-actual results included in the annual operating budget, an explanation of material variances, and a cash flow projection.

The monthly statements should be reviewed by the President prior to distribution to the Treasurer for initial comments.

#### Year-End Audit:

EcoHealth Alliance's fiscal year shall end on June 30<sup>th</sup>.

At fiscal year-end, EcoHealth Alliance shall engage the services of an independent certified public accounting firm that is knowledgeable and experienced in performing audits of firms similar to EcoHealth Alliance.

The audit report should be prepared using Generally Accepted Accounting Principals for not-for profit organizations and summarizing the total income and expense activity for the year in accordance with FASB 117.

This report will be initially reviewed by the President and CFO, and then by the Treasurer as chair of the Audit Committee who shall meet with the accounting firm to review the audit findings including any management letter.

The finalized audit shall be distributed to the entire Board at its annual meeting.

## **Grant Management and Compliance**

1. When a new grant is received or renewed, a copy of the executed grant must be forwarded to the CFO.
2. The CFO should set up a permanent file for the grant and maintain the contract along with any other financial correspondence regarding the grant.
3. It is the responsibility of the CFO to review the grant contract and extract any fiscal items which must be complied with by ECOHEALTH ALLIANCE. Typically, for government grants, reference will be made to various publications put out by the Office of Management and Budget (OMB) and the Comptroller General's Office to which ECOHEALTH ALLIANCE is responsible for adhering.

Currently, the publications include:

OMB Circular A-122            A Cost Principles for Non-Profit Organizations@

OMB Circular A-133            A Audits of Institutions of Higher Learning & Other Non-Profit Organizations@

4. It is a policy of ECOHEALTH ALLIANCE to adhere to any restrictions imposed by its funding sources, both governmental and private. Therefore, ECOHEALTH ALLIANCE employees are expected to bring to the attention of management, any instances of non-compliance.
5. When ECOHEALTH ALLIANCE is expending federal funds, prior written approval from the funding agency is required for the purchase of:
  - a. Capital expenditures for land or buildings
  - b. Insurance and indemnification expenses
  - c. Pre-award costs
  - d. Public information service costs
  - e. Publication and printing costs
  - f. Rearrangement and alteration costs
6. ECOHEALTH ALLIANCE will never request federal funds to pay for the following costs:
  - a. Bad debt expense
  - b. Contingencies
  - c. Contributions or donations to others
  - d. Un-authorized entertainment expenses
  - e. Fines and penalties
  - f. Interest, fundraising and other financial costs
7. Federal funds received in advance will be deposited into a separate federally insured bank account. Any interest earned from those monies will be submitted to the funding agency.

## **Monitoring of Restricted Funds and Government Awards**

### **Statement of General Policy**

When EcoHealth Alliance accepts funds from a private foundation, government agency, or private donor, it also accepts the responsibility to ensure that all funds are spent in accordance with the requirements set forth in the agreement with the funder which may take the form of a grant award letter, contract, cooperative agreement or subcontract award.

Funds that are spent directly by EcoHealth Alliance must adhere to the policies and procedures outline in the EcoHealth Alliance Accounting Manual.

When necessary, EcoHealth Alliance will enlist the professional assistance of other individuals and organizations in order to carry out the purposes of the grant award. Funds provided to individuals (herein “independent contractors”) or entities (herein “sub-contractors” for private grants or “sub-recipients” federal awards) are required to adhere to the same financial management requirements as EcoHealth Alliance staff.

### **Grant Management Responsibilities:**

For private awards, it is the responsibility of the EcoHealth Alliance Department Head to monitor the use of funds to ensure that they are disbursed solely to achieve their intended programmatic purpose.

For government awards, it is the responsibility of the Principal Investigator (“PI”) to monitor the use of funds to ensure that they are disbursed solely to achieve their intended programmatic purpose. In addition, the PI, in coordination with the EcoHealth Alliance Finance Department (“Finance”), ensures that all expenses are made in accordance with federal the requirements as specified in OMB Circular A-122.

The EcoHealth Alliance Chief Financial Officer (“CFO”) shall have overall responsibility to ensure that expenses incurred pursuant to grant awards adhere to EcoHealth Alliance’s fiscal management policies and procedures.

### **Grant Management Procedures**

1. Subject to the approval of the President of EcoHealth Alliance, the appropriate Department Head or PI may select independent contractors or sub-recipients to participate in the grant project.
2. All independent contractors and sub-recipients shall be required to enter into a contract with EcoHealth Alliance that specifies the terms and conditions of the



relationship with EcoHealth Alliance as well as the scope of services being performed.

3. For contracts paid for with federal funds, the sub-recipient shall agree to adhere to all federal requirements regarding invoicing, documentation, and reporting as well as a requirement that they adhere to the conditions of the prime award and all applicable federal and state laws and regulations.
4. Sub-recipients who are required to be audited in accordance with OMB Circular A-133 shall be required, during each year in which they receive payments from EcoHealth Alliance, to submit their annual A-133 audit and management letter to EcoHealth Alliance. In addition, they are required to submit their approved Federal Indirect Cost Rate to validate any overhead charged to the federal award.
5. EcoHealth Alliance shall review the A-133 audit and management letter. When necessary, EcoHealth Alliance shall confirm that the sub-recipient has taken appropriate action to correct any reported deficiencies or material weakness.
6. It is the responsibility of the Department Head or PI (or their designate) to approve, in writing, the disbursement of funds to contractors or sub-recipients for services rendered under the award.

The Finance Department shall not process any invoice that does not have sufficient documentation to support the expense as well as the proper authorization for payment. The Finance Department shall exclude from payment any expense that is not allowable under either federal or EcoHealth Alliance policies.

7. Unless otherwise specified in the contract, all invoices for purchases or services rendered under grant awards must be submitted to EcoHealth Alliance no later than 60-days after the end date of the award.
8. EcoHealth Alliance shall not disburse any final funds to a contractor or sub-recipient until the Department Head or PI advises the CFO that all reporting and programmatic requirements of the contract have been met.

## **Computer System Backup Procedures**

1. The Assistant Business Manager is responsible for backing up the hard drive of the accounting system at the close of business each day.
2. ECOHEALTH ALLIANCE uses a five (5) day tape rotation and back up system. There should be five (5) tapes numbered A1" through A5". Each label should also contain the date of backup.
3. Each day the next sequentially ordered tape should be used to back up the accounting files. Complete, not modified, backups should be done.
4. When a tape is ready to be replaced, a newly formatted tape should be labeled with the date. The old tape should be discarded.
5. The Assistant Business Manager should lock up the tape in a fire proof safe overnight. All tapes should be kept in a fire proof safe at all times. The following day, the tape will be placed at the end of the tapes to be rotated.
6. At month-end, backup tapes should be produced and stored off premises for safeguarding.
7. Annual tapes should be compressed and stored in a fire proof safe.

## **Other Fiscal Policy Requirements**

1. All cash accounts owned by ECOHEALTH ALLIANCE will be held in financial institutions which are federally insured.
2. Employee paychecks and/or personal checks will not be cashed through the petty cash fund of ECOHEALTH ALLIANCE.
3. Salary advances will be approved by the Chief financial Officer subject to the EcoHealth Alliance Personnel Manual.
4. No travel cash advances will be made except under special conditions and pre-approved by the Chief Financial Officer. Reimbursements will be paid upon full expense reporting using the official ECOHEALTH ALLIANCE form within the normal disbursement schedule.
5. Any item whose value exceeds \$50.00, received via donation, will be recorded in the books and records of ECOHEALTH ALLIANCE.
6. Fiscal Management personnel are required to take annual vacation which will not interfere with fiscal procedures. Variances to this policy shall be made in special circumstances, with written permission from the President.
7. All volunteer time which exceeds \$50.00 shall be recorded in the books and records of ECOHEALTH ALLIANCE.
8. It is the policy of ECOHEALTH ALLIANCE to reimburse out of pocket expenses only when supporting documentation has been presented for approved costs incurred.

9. It is the policy of ECOHEALTH ALLIANCE to establish pay rates which equal or surpass the federal minimum wage.
10. All funds received by ECOHEALTH ALLIANCE for each project will be segregated into separate project accounts in the general ledger to avoid any possibility of commingling project monies with general operating funds. A full computerized ledger accounting system will be maintained. Monthly financial reports will be produced for each project and reviewed with the project manager.
11. The President and Chief Financial Officer are signatories on all ECOHEALTH ALLIANCE bank accounts.
12. Bank statements will be reconciled monthly in order to account for any outstanding or lost checks.
13. Expense reports will be maintained which will disclose the nature of expenses, and the dates incurred.
14. The EcoHealth Alliance Conflict of Interest policy, contained in the Bylaws, is incorporated into this manual by reference.
15. The EcoHealth Alliance statement of “employee concern,” contained in the employee manual is incorporated by reference.

## Appendix A

### **TRAVEL AND EXPENSE POLICY & PROCEDURES**

#### **PURPOSE**

EcoHealth Alliance operates as a tax-exempt organization that is transparent in its financial operations and responsive to the trust placed in it by public and private supporters. The purpose of this policy is to ensure that all expenses made by EcoHealth Alliance staff are directly related to the efficient management of its operations and directly related to fulfilling its mission.

The policy of EcoHealth Alliance is to pay directly or reimburse employees for all expenses that are necessary, normal and reasonable and that are incurred while in the conduct of EcoHealth Alliance business, provided that expenses are documented, fully explained and approved by a supervisor.

EcoHealth Alliance has programs, funders, partners, and audiences throughout the world. The organization undertakes much of its work in collaboration with others, and at field sites away from the administrative offices, and at WT sponsored meetings. As a result, there are a variety of expenditures made in support of our programs, cultivation and relationship management that are important to our work. Travel and related expenses are significant operating costs. We have a fiduciary responsibility to use funds prudently and only for authorized purposes.

This document sets the “ground rules” for EcoHealth Alliance staff which are necessary for effective financial reporting, compliance with OBM Circular A-122 and to support reporting on organizational and funders’ budgets. It is the responsibility of each employee to adhere to these guidelines. Furthermore, supervisors have a responsibility to be familiar with the organization’s policy, and to ensure that the appropriate documentation, as discussed below, is obtained and that rules are adhered to by them and their staff.

EcoHealth Alliance depends on its employees to use good judgment and to make sound business decisions keeping the overall benefit of the organization in mind. No policy will cover every possible contingency that might arise in the course of your work and travel. Therefore, we ask you to exercise the same level of care and diligence with respect to travel and other expenditures as you would in any other work activity.

Although EcoHealth Alliance has many sources of funding, it will apply the federal A-122 rules to all goods and services purchased with funds from private foundations.

Alcohol and other expenditures that may be required for donor and partner cultivation may not be charged to federal grants or other sources that prohibit such expenditures. These expenditures need to be justified and may need to be divided onto a separate receipt to ensure proper charging.

#### **USE OF CORPORATE CREDIT CARD**

The Corporate credit card is provided as a privilege and convenience to staff. Subject to certain limitations, it can be used to purchase goods and services directly, through

R2 5/12/2010

telephone orders, and online internet transactions. Credit card limits for individual staff will be set in consultation between Program Leads (e.g., Vice Presidents and Directors) and the finance department.

All credit card purchases must be documented with an invoice or signed vendor receipt stating the quantity and the description of the item(s), the project, funder, and line item to be charged on the appropriate EcoHealth Alliance standardized form. In environments where vendors may not provide an invoice or receipt, EcoHealth Alliance employees should purchase a receipt book and have the vendor sign for the goods or service purchased.

It is the employee's responsibility to maintain a file of these purchases and prepare an expense report monthly for these items. EcoHealth Alliance receives a monthly bill for credit card charges that must be inspected and properly reconciled to avoid credit card fraud as well as late payment charges. It is the employee's responsibility to report all unknown credit charges as well as to provide receipts for each charge.

Credit card documentation consist of the itemized invoice provided by the vendor that lists the item, cost, tax, and is signed by the employee. The credit card charge slip is not acceptable documentation of the purchase.

Credit card documentation is reviewed by Administrative staff to insure, documentation is complete, clerically accurate, complies with EcoHealth Alliance expense policy, complies with grantors requirements.

Employees are responsible for submitting trip per diems travel reconciliation reports to determine any travel spending in excess of allowable federal per diems and their proper allocation.

## CASH ADVANCES

When traveling overseas for more than 10 consecutive days, the employee should request a travel advance. That advance request should be made not less than 10 business days prior to the trip.

Cash advances by credit card of more than \$500 for a single trip must be approved by the unit manager or from the CFO in the case of unit managers.

All travel advances must be reconciled within 5 business days of the employees return to work. Under no circumstances will a new advance be made until the prior advance has been reconciled.

## MAJOR EQUIPMENT PURCHASES

Employees may not purchase any equipment (computers, printers, research equipment, etc. with a cash value of over US\$100 per item) via a credit card without the prior approval of the Unit Head.

It is preferred that individual equipment items costing over \$500 be purchased by EcoHealth Alliance's administration division for the employee using the agency's tax exemption certificate; the administration division is committed to facilitating purchases in a timely fashion. In urgent cases, where program activities are time-sensitive, the Unit Head may allow credit card purchases of these items. Unit Heads may request that the CFO waive this provision and designate a staff member to purchase equipment. However, all such purchases are subject to the following limitations:

1. Funding for this equipment has been provided for in an approved grant budget
2. The purchase price excludes the payment of sales taxes whenever reasonably possible
3. EcoHealth Alliance has received, or in the case of federal grants will receive, cash reimbursement for the purchase

Employees may not purchase equipment with EcoHealth Alliance funds to replace personal items that have been lost or stolen while traveling.

#### TAX EXEMPTION FORMS

EcoHealth Alliance employees may not sign or use the NYS or Florida tax-exempt certificate for any purchase, unless specifically approved by the unit head. These forms are deemed "controlled" and may only be signed by the President, Chief Financial Officer, or head of the Florida-based aquatics program. Staff may request tax-exempt forms from the CFO, providing the necessary information for the form to be sent to the vendor (name, address, etc.)

#### TRAVEL/EXPENSE REPORT FORMS

The travel expense form ("EcoHealth Alliance Travel & Expense Report") can be found on the intranet page on the P drive. Employees should expedite processing by completing a separate report for each trip. Travel and expense forms needs to be filled out, approved, and submitted to Finance on completion of a trip or on the 15<sup>th</sup> of the month for any miscellaneous purchases on the corporate credit card or for cash. Expense reimbursements are normally processed on the 9<sup>th</sup> and 23<sup>rd</sup> of the month to be included with payroll processing, and included in employees net pay. The Office or Finance manager will review the reports for issues relating to completeness (i.e. coding, missing receipts, clerical accuracy, etc.), that the report has been approved, and that the report is in compliance with organizational policy.

#### RESPONSIBILITIES FOR PREPARATION AND APPROVAL OF EXPENSE FORMS

1. Preparation

The employee reporting travel expenses is responsible for the timely preparation and submission of reports covering reimbursable expenses and corporate credit card charges. This responsibility includes appropriate records required to support the expense involved including the receipt for each item expensed.



## 2. Advance Approval of Trip

Program leads (Vice Presidents and Directors) are responsible for supervising the travel of their respective staff, and for insuring that projects have adequate funds to support travel costs in light of salary and other obligations.

All travel must be approved by the employee's Unit Head with notice to the Chief Financial Officer of the projected cost of the travel along with the funding source for the travel, if this is not already listed in the approved budget. Employees may not utilize funds from sources not authorized in the budget and will not be reimbursed for such expenditures.

## 3. Approval of expenses:

It is the responsibility of supervisors to verify the accuracy and appropriateness of all expenses, receipts, and explanations on the expense form. The manager may choose to approve expense reports electronically but the original (hard copy) of the report together with original receipts must be submitted to the Finance department before it can be processed with both the employees and supervisors signature.

## 4. Extended Stay –Field Work

For staff conducting fieldwork for extended periods (a month or greater) receipts should be kept for all items where possible. Purchases should be recorded in the currency in which they are made, and converted at the rate at which local currency was purchased. Purchases made with EcoHealth Alliance's credit card should use the amount actually charged in US\$. The travel report would have a total in local currency and in US dollars. Credit Card reports are to be submitted monthly.

## RECEIPT REQUIREMENTS

Receipts are required for all credit card purchases and all cash expenditures over \$10. This includes, but is not limited to, airplane passenger ticket receipts, detailed lodging statements (folios), meals, taxi receipts, train ticket stubs, rental car agreements, airport shuttle receipts, and parking (if available). Please obtain receipts for your e-tickets. For some carriers, the flight information and cost is on your electronic ticket given at check-in. For some carriers, however, you will need to ask separately to obtain this receipt. An itinerary alone does not constitute a receipt, as there is no evidence that the travel was actually taken as booked.

The Finance Department would greatly appreciate it if you would tape your original receipt on an 8 ½ by 11-inch piece of paper and staple to the Expense Report. This procedure will help you organize your expenses and greatly reduces the chances for receipts to be separated and lost. You are encouraged to keep a copy for your own records in the event the original is lost or misplaced.

As stated above, a Credit Card receipt is not sufficient documentation of the expense. You may provide photocopies of a vendor receipts or a scanned copy. Similarly, credit card statements or tear stubs are not satisfactory receipts.

## TRANSPORTATION

### a. Commercial Airline Travel

We do not have an internal EcoHealth Alliance travel coordinator nor do we have a EcoHealth Alliance authorized travel agent. You are responsible for arranging your travel plans. Frequent flyer miles accrued on EcoHealth Alliance's corporate credit card accounts are for use in business travel. EcoHealth Alliance will occasionally consolidate premium rewards to support unrestricted expenditures.

Travel will be coach (economy) class for travel. Whenever possible, flights should be booked at least seven days prior to departure and should be BPA (best price available) as this can result in substantial savings.

Airline tickets are often available at significantly reduced costs if the travel involves a Saturday overnight stay. Employees may elect to spend Saturday nights at their destination to obtain this lower airfare, provided there is no additional net cost or no lost working time to EcoHealth Alliance. In general, employees may not pilot a private plane nor be a passenger in a private plane while traveling on EcoHealth Alliance business. If this is absolutely required, you must notify Finance one month in advance so that proper insurance may be obtained for your trip. If that is not possible or is cost prohibitive, you will need to make other travel arrangements.

Any partially unused ticket needs to be returned for reimbursement. Please exercise care in the handling of these tickets, as they are essentially equivalent to cash. If a portion of the ticket was used, a copy needs to be attached to the expense report, noting which portion was used.

### b. Automobile Rental

The Company standard for rental cars is a compact sized car, unless the trip includes more than two employees traveling together, or the employee's equipment requires a larger car or there are other needs (e.g. 4-wheel drive for off paved road travel). Rental car cost should be billed to the corporate credit card. The Company's insurance policy covers rental cars. Any additional insurance offered at the time of rental needs to be declined, except where car rentals outside the United States are not covered by EcoHealth Alliance's insurance or by Company credit card insurance. Rental cars should be returned with a full tank of gas (or gas purchased at the time of rental, as some companies structure their agreements) since rental car companies typically charge a premium per gallon for refilling the tank.

### c. Miscellaneous Transportation

Personal automobile use will be reimbursed at the going IRS approved mileage

rate at the time of travel.

Airport parking will be reimbursed at cost. If you are out of town for five days or more, you are expected to use long stay or off-site parking. Employees are encouraged to calculate the costs of long stay parking versus taxi/limousine service from their place of residence to determine and choose the cheapest option for any given trip.

## EXTENDED STAY FIELD WORK

When an employee is engaged in fieldwork for an extended period of time (more than one month) at a research site, lodging and/or meals will be reimbursed or advanced to the employee as needed.

## LODGING

The daily cost of lodging includes single room occupancy rate and applicable taxes. Hotel “no show” charges are not reimbursable by the Company. It is the employee’s responsibility to manage travel arrangements and cancellations.

Travel cost limitations or guidance relating federal or state grants need to be complied with. It is the employee’s responsibility to be knowledgeable about such terms and conditions

## MEALS & ENTERTAINMENT

The cost of meals includes the total cost including taxes, tips, or service charges as applicable. Travelers are expected to use their best judgment in selecting appropriate and reasonable dining establishments.

For meals including other than yourself, you must include names and the purpose of the meeting, in addition to the cost. Under the present Internal Revenue Service regulations, all employees are required to substantiate, in detail, all expenses incurred: who was entertained, their business relationship, where the entertainment took place, and the purpose of the event. Please pay special attention to providing this information. Failure to do so may result in these costs being treated as taxable income to you. We suggest that you write this information on the restaurant receipt to facilitate recording the details of each expense. Under the present IRS regulations, entertainment expense must conform to the following two requirements:

- The expenditure must directly precede, include or follow a substantial and bona fide business discussion.
- A business benefit is expected to be derived from the entertainment.

EcoHealth Alliance will not reimburse employees for meals purchased for other

EcoHealth Alliance employees while in your administrative offices unless these is a compelling business purpose and it is approved by the employee's supervisor.

Casual group lunches, retirement functions, birthdays, personal occasions, and other entertainment of fellow employees are generally not reimbursable business expenses. (See below)

Expenditures for alcoholic beverages are not permitted on any federal grants or from other donor agencies that prohibit such purchases.

## MISCELLANEOUS OTHER EXPENSES

### a. Gratuities/tips

Gratuities/tips needs to be appropriate for the services rendered. In the United States of America guidelines are restaurant – 15% of the net (pre-tax) bill; cab drivers – 10-20% of the total fare; porter/bellhop - \$1 per bag; doorman - \$1. Elsewhere in the world tips should be given according to local practices.

### b. Personal Entertainment

The Company does not reimburse the costs of personal entertainment (in-room movies, ball games, magazines, etc.) that might be incurred while traveling.

### c. Spouse Accompanies Traveler – Personal Reasons

Occasionally a spouse or friend accompanies a traveling employee for personal reasons. In such cases, the Company does not pay more than if the employee had traveled alone. Lodging must be at the single occupancy rate and expenses for meals must reflect only the cost of the employee's meals.

### d. Retirement Functions, Holiday Celebrations

Celebrations of this type, which include employees of EcoHealth Alliance, are personal in nature and therefore the company cannot reimburse expenses related to such affairs. Approval is required in advance for any exceptions.

### e. Business Meetings

Expenses related to such a meeting, be it for a luncheon, dinner, etc., are business expenses, chargeable to the Company, and needs to be included on an expense report with the required documentation.

### f. Professional Memberships and Dues

EcoHealth Alliance will only pay dues for staff membership in professional societies with specific approval by supervisors. Employee may not directly pay or use a credit card for these items but should request a check to be issued by EcoHealth Alliance to the organization.

g. Business Gifts

In light of certain international practices, business gifts may not exceed \$50 per trip or \$200 per fiscal year, except by prior approval from supervisor.

h. Medical Expenditures

EcoHealth Alliance has an international emergency evacuation service. Other international emergency medical expenditures are allowable where reasonable, and will be considered on a case-by-case basis.

i. Home Office Expenses

EcoHealth Alliance provides adequate office space, equipment, and services to its employees wherever possible and cost effective. In recognition that some employees will need to work at home, EcoHealth Alliance will cover the cost of some home office expenses with the prior written approval of the President.

These costs shall be limited to a pro-rata portion of internet service and phone service. EcoHealth Alliance shall not pay for any other utilities, property tax, repairs, or maintenance costs. Any equipment purchased for home office (e.g., printers) use by EcoHealth Alliance employees must be approved by supervisors, is the property of the Company, and must be surrendered upon request for use elsewhere as needed.

j. Airline Lounge Fees

Upon the written approval of the Chief Financial Officer, EcoHealth Alliance shall pay for an employee's membership in one airline lounge program upon the following conditions:

The employee is a member of EcoHealth Alliance's senior management.  
The employee has international program management responsibilities.  
The employee has more than two international travel trips in any twelve month period  
Such fees shall be charged to a non-federal funding source.

EXPENSES NOT REIMBURSABLE

This a guide and is not a complete list of those expenses, which would not be reimbursable

1. Airline or other travel insurance, personal property insurance, etc.
2. Babysitter fees, day care expenses.
3. Barbers and hairdressers.
4. Pet care, including kennels.
5. Movies or other personal entertainment, including in-room movies or headphones for in-flight movie.

6. Mini-bar (unless reasonably necessary e.g. as a result of late arrival, in-room meetings, etc.)
7. Magazines, books, and newspapers.
8. Parking tickets, traffic tickets or court fees.
9. Car towing if illegally parked.
10. Airline upgrades (corporate credit card frequent flier mile obtained upgrades for non-stop flights over 6 hours are permitted).
11. Air phone charges (except when reasonably necessary.)
12. Dry cleaning or laundry (unless traveling for 5 days or more.)
13. Toiletries or other personal items
14. Commuting costs between home and office (see below).

#### Commuting Expenses

EcoHealth Alliance does not pay for any employee commuting expenses. Using the IRS definition of commuting, all travel expenses from home to the first work site or from the last work site to home, is excluded. This includes mileage charges, tolls, parking fees or gas. Such payments are subject to IRS definition of “compensation” and will be reported to the IRS as miscellaneous income

However, the charges that arise from going from the first work site to another site, such as an airport, are reimbursable.



## **Record Retention**

## **Appendix B:**

This record retention schedule has been created as a guideline for each unit of EcoHealth Alliance that generates important program and financial information.

This policy does not apply to data collected as part of EcoHealth Alliance's scientific and research mission unless it is part of any contractual obligation entered into by EcoHealth Alliance and a funding source. This includes such items as final reports, budget reports and the like.

ITEM	PERIOD OF RETENTION	RESPONSIBLE UNIT
Audited Financial Statements	Permanent	Finance
A-133 Audits	Permanent	Finance
Management Letters	Permanent	Finance
Federal and State Tax Forms	Permanent	Finance
Invoices	5 Years	Finance
Grant Proposals-Private	2 Years	Development
Approved Grant Letters and Budgets	2 Years beyond grant term	Development
Grant Proposal-Government	2 Years	Program
Approved Grants-Government	3 Years beyond grant term	Program/Finance
Payroll Registers	5 years	Finance
Employment Records	Permanent	Finance
Journal Entries	2 Years after audit	Finance
Travel and Expense Reimbursement	2 Years after audit	Finance
Sub-contracts for Services or grant pass-through	2 Years after audit	Finance
Fixed Asset Purchases	2 Years after full depreciation	Finance
Audit Work papers	10 Years after audit	Finance
Bank Statements and Reconciliations	7 Years after audit	Finance
Endowment Documents	Permanent	Finance
Legal Documents	Permanent	Finance

## FINANCE DEPARTMENT FILING PROCEDURES:

## Appendix C:

### Human Resources Files

- HR files are confidential and filed separately. Employee files are located in locked filing cabinet 15 (across from filing room and patio access).
- Payroll records are in binders in (b)(6) office.

### REVENUE

#### Inbound Wires:

- All inbound wires should be placed in the Inbound Wire Transfer binder located on (b)(6). (b)(6) enters one copy in the binder and one in the Funder file in file cabinet 5. Attached should be 1 copy of the bank transaction and copy of the contract letter or invoice.
- Federal drawdown documentation and contracts are located in (b)(6) office.

#### Cash Receipts:

Cash receipts are photocopied and deposited weekly by (b)(6). A print out of the MIP report for each session is attached to the photocopied checks and bank receipt and filed by month in filing cabinet 3.

#### Credit Card Donations:

-Credit card donations, printed from the merchant credit card machine and filed by date, sorted by month. The credit card machine is batched every Friday and the weekly report is filed in the CC donations binder. Reports are reconciled monthly with Hopeton and development. These binders are above the filing cabinets 4 and 5.

#### Credit Card Merchant Statements:

-Merchant statements from American Express Master Card and Visa are located in a binder as well. This binder is located on top of filing cabinets 4 and 5.

#### Haverford Statements:

-Haverford statements and documents should be sorted in a binder. There are two separate binders that are divided by name. These binders are also located above filing cabinets 4 and 5. (b)(6) should be notified when these statements arrive.

### EXPENSES

#### Contracts (Service Providers/Consultants)

- 2 copies signed and dated
- Filed in vendor files with supporting documentation in filing cabinet 4.

#### Outbound Wires:

-Requires a wire request with wire instructions and supporting documentation or an invoice. All outbound wires should be placed under the vendor name in the invoice/vendor files in filing cabinet 4.

#### Cash Reimbursements:

-All Cash Reimbursements through payroll are filed by month and located in filing cabinet 3.

Wells Fargo Credit Card:

-Employee coded Excel spreadsheet and receipts are attached to the statement sent by Wells Fargo and filed by employee name in filing cabinet 3.

Wachovia Bank Statements:

-Transaction notifications and various documents related to Wachovia belong in a binder. This is located on top of filing cabinets 4 and 5. There should be two copies of transaction notifications. One should go to (b)(6) and the other should be placed in the binder. If there is a stock transaction, a copy should also be given to (b)(6).

Journal Vouchers:

-Journal Vouchers should be placed in the appropriate binder. (b)(6) should be given copies of each JV which are filed by month in the JV binder on (b)(6). (b)(6) maintains a file of posted JV.

FY08

All FY08 documents have been moved to the filing cabinets in the storage room near the balcony. Each cabinet has been labeled accordingly.

FY09

All FY09 documents are being moved to the filing cabinets 1 and 2. Each cabinet is labeled accordingly.

FY10

All FY10 documents (invoices/cash receipts) have replaced FY09 documents in the filing cabinets. These are located in filing cabinets 3 and 4.

Revisions:

5/12/2009 Records Retention: government grant retention reduced to three years



EHA LAND USE CHANGE & DISEASE EMERGENCE BUDGET

FRINGE RATE

FRINGE RATE		TITLE		b)(4)		TOTAL	
Daszak, Peter		Chief of Party		b)(4)			
Fringe (Daszak)							
(b)(6)							
TOTAL FRINGE							
TOTAL SALARY							
TOTAL SALARY & FRINGE							
TRAVEL							
Domestic							
International							
TOTAL TRAVEL							
OTHER DIRECT COSTS							
Dataset Acquisition							
Software and Reference Materials							
Computers (2)							
EHA Malaysia Office		EcoHealth Alliance Malaysia Office E					
Supplies							
Communications		Telephone, Wireless Sim Cards In-Co					
TOTAL OTHER DIRECT COSTS							
SUBCONTRACTS							
UMS		Subcontract w/ (b)(4) overhead - see b					
SWD		Subcontract w/ (b)(4) overhead - see b					
TOTAL SUBCONTRACTS							
TOTAL EHA DIRECT							
MODIFIED DIRECT							
INDIRECT		(b)(4)					
TOTAL							
COST SHARING		EHA UNRESTRICTED					
UNIVERSITY OF MALAYSIA SABAH							
SALARY							
TOTAL SALARY				\$ -		\$ -	
TRAVEL							
TOTAL TRAVEL		(b)(4) KUL<->BKK per year		\$		(b)(4)	
OTHER DIRECT COSTS							
Office costs				\$			
Annual Meetings		(b)(4) per meeting year		\$			
Promotional Materials				\$			
TOTAL OTHER DIRECT COSTS				\$			
TOTAL DIRECT				\$			
INDIRECT (8%)				\$			
TOTAL				\$			
SABAH WILDLIFE DEPARTMENT							
SALARY							
				\$ -		\$ -	
TOTAL SALARY				\$ -		\$ -	
TRAVEL							
TOTAL TRAVEL				\$		(b)(4)	
OTHER DIRECT COSTS							
Annual Meetings		(b)(4) on Conservation & Land Development		\$			
Training & Education				\$			
TOTAL OTHER DIRECT COSTS				\$			
TOTAL DIRECT				\$			
INDIRECT (b)(4)				\$			
TOTAL				\$			

b)(4)



# EHA LAND USE CHANGE & DISEASE EMERGENCE BUDGET

FRINGE RATE		(b)(4)		
SALARY & FRINGE	TITLE			TOTAL
Daszak, Peter	Chief of Party	(b)(4)		
Fringe (Daszak)				
(b)(6)				



EHA Malaysia Office	EcoHealth Alliance Malaysia Office Expenses				
Supplies					
Communications	Telephone, Wireless Sim Cards In- Country, Internet Access, Skype Credit, Go-To Meetings				
TOTAL OTHER DIRECT COSTS					
SUBCONTRACTS					
UMS	Subcontract w/ (b)(4) overhead - see below				
SWD	Subcontract w/ (b)(4) overhead - see below				
TOTAL SUBCONTRACTS					
TOTAL EHA DIRECT					
MODIFIED DIRECT					
INDIRECT		(b)(4)			
TOTAL					
COST SHARING	EHA UNRESTRICTED				

(b)(4)

# EHA TRAVEL DETAIL

(b)(4)	BKK PER DIEM (\$146 Hotel; \$103 Meals and Incidentals)	(b)(4)	TOTAL
	KUL <-> BKK	(b)(4)	
(b)(6)	BKK	(j)(2); (b)(4); (b)(6)	
(b)(6)	KUL <-> BKK		
(b)(6)	TOTAL		
(b)(6)	EWR <-> BKK		
(b)(6)	(KUL <-> BKK) at \$300 for flight; nights at \$125 per night; food and incidentals at \$69 per day for 6 days		
	INTERNATIONAL TOTAL		
(b)(4)	KUL PER DIEM (\$165 Hotel; \$92 Meals and Incidentals)	(b)(4)	TOTAL
(b)(4)	EWR <-> KUL	(b)(4)	
(b)(4)	PD, WBK, JHE, & SE EWR <-> KUL	(b)(4)	
(b)(4)	PD, WBK, JHE, & SE KUL	(b)(4)	
	PD, WBK, JHE, & SE TOTAL	(b)(4)	
	KM & LL		
	KM & LL		
(b)(4)	KM & LL		
	INTERNATIONAL TOTAL		
	PD & WBK EWR <-> KUL x		

## EcoHealth Alliance Budget Narrative

Chief of Party (COP) Daszak, (b)(6)

(b)(6)

### A. Personnel

COP Daszak will commit (b)(6) to this project, though he will only charge a portion of his salary to this grant and will use EHA core funds to cover the rest of his salary. COP Daszak will provide overall management and coordination of program vision, direction and functional successes; and is responsible for the administration and integration of the entire program.

(b)(6)

(b)(6) to this project to manage the day-to-day of the project in Malaysia, with regular communications and assistance of the other key personnel, the administrative staff from the home office, the Center of Excellence in Sabah and other key partners.

(b)(6)

(b)(6) to this project, though he will only charge a portion of his salary to this grant and will use EHA core funds to cover the rest of his salary. He will ensure high level integration of project activities and products with stakeholder and partner needs and priorities, help develop and implement workshops with the DCOP and the Center for Development and Health, provide consistency in approaches across the project, and provide the oversight for sustainable transition of relevant activities to partners by the end of the project.

(b)(6)

(b)(6) to this project, though he will only charge a portion of his salary to this grant and will use EHA core funds to cover the rest of his salary. He will identify opportunities and strategies for program outcomes to serve as guidance for policy and best practices among government and non-governmental stakeholders in Sabah, Malaysia, and regionally as appropriate.

(b)(6)

(b)(6) He will be (b)(6) and work under the direction of the Deputy Chief of Party and Stakeholder Coordination Lead to help assemble data and organize stakeholder meetings in Year 1 of the project. He will also serve as a technical expert for the field team and a liaison with IDEAL.

(b)(6)

(b)(6) to develop the avoided costs model and participate in the associated data collection.



(b)(6) to oversee the execution of the modeling strategy, collaborating with the other scientists and actively communicating and discussing the model developments with the CoP.

(b)(6) to manage the disease and land cover geodatabases with particular attention to the assurance of data quality.

(b)(6) assist in the supervision of the data collection, and connection of DEEP FOREST project data to the quantitative tools.

(b)(6) to provide programmatic support for the project's health communication and policy outreach activities, and the formation of collaborations with non-traditional partners.

(b)(6) to provide administrative oversight and support for the project's financial management, working closely with the CFO at EHA, and administrative staff funded through EHA core funds.

We are requesting 4 months p.a. for an assistant economist to serve as Economic Modeler.

## **B. Fringe benefits.**

Fringe benefits are calculated based upon EcoHealth Alliance's federally negotiated rate of (b)(4) of base salary.

All salaries increase by (b)(4) per year for cost of living increases. EHA uses the NYNJ Standard Metropolitan Statistical Area Metropolitan (SMSA) Year to Year Urban wage earners consumer Price percentage increase index as a basis for salary increases. Additionally promotions and merit increases are made annually based on performance reviews, guidance outlined in EHA's Personnel Manual. For planning purposes and grant proposal writing, the organization increments salaries by (b)(4) annually.

## **C. Travel.**

### International:

We request a total of (b)(4) to support International Travel respectively in Y1 and Y3 and (b)(4) in Y2. Travel is estimated as follows.

(b)(4) All round trip flights from Kuala Lumpur to Bangkok are estimated at \$204. The per diem rate for Bangkok is \$249, which includes hotel rate at \$146; meals and incidentals at \$103. Each year (b)(6) will travel to Bangkok (b)(6) and stay for 5 nights and 6 days. We estimate costs per visit at  $(\$204 + \$146)$  (b)(4)



(b)(4) of \$103 x 2 days) \$1,501 totaling (b)(4) visits per year.

(b)(4) All round trip flights from Kuala Lumpur to Sabah are estimated at \$300. The per diem rate for Sabah is \$194, which includes hotel rate at \$125; meals and incidentals at \$69. In (b)(6) respectively, to work with stakeholders and establish the center of excellence. We calculate the (b)(6) a cost of  $(\$300 + \$125 \times \$69 \times 75\% \text{ of } \$69 \times 2 \text{ days}) \$1,304$  and annual costs at  $(\text{(b)(6)} \times \$1,304)$  (b)(4)

(b)(4) All round trip flights from Newark USA to Kuala Lumpur Malaysia are estimated at \$2,200. The per diem rate for Kuala Lumpur is \$257, which includes hotel at \$165 and meals and incidentals at \$92. Each year (b)(6) COP Daszak (b)(6) and (b)(6) will travel to Kuala Lumpur to coordinate with Malaysia program staff and stakeholders. They will stay for (b)(6) and we estimate costs at  $(\$2,200 + \$165 \times \text{(b)(6)} + \$92 \times \text{(b)(6)} + 75\% \text{ of } \$92 \times \text{(b)(6)})$  (b)(4) per year for (b)(6)

(b)(4) In (b)(6) COP Daszak (b)(6) will travel an additional (b)(6) to Malaysia. We calculate this to be an additional  $(\$2,200 + \$165 \times \text{(b)(6)} + \$92 \times \text{(b)(6)} + 75\% \text{ of } \$92 \times \text{(b)(6)})$  (b)(4) per person per year (b)(6) in travel costs based upon the same per diem, flight, and hotel as above totaling (b)(4) per year for only (b)(6) and (b)(6)

(b)(4) In (b)(6) will travel from the United States to Kota Kinabalu where he will be based. Roundtrip airfare is calculated at \$2,609.

We request additional support for (b)(6) to travel to Kuala Lumpur (b)(6) in (b)(6) for two weeks to coordinate field work and data collection. We calculate this to be an additional  $(\$2,200 + \$165 \times \text{(b)(6)} + \$92 \times \text{(b)(6)} + 75\% \text{ of } \$92 \times \text{(b)(6)})$  (b)(4) per person per year in travel costs based upon the same per diem, flight, and hotel as above totaling (b)(4) per year.

## D. Supplies

We have budgeted (b)(4) for supplies, including office supplies for EcoHealth Alliance's HQ and our office in Malaysia, supplies for travel and computer supplies for modeling and analytical activities.

## E. Other

(b)(4) **Data-set Acquisition:** We have budgeted (b)(4) total (b)(6) for data set acquisition: (b)(4) for (b)(6) and (b)(4) for (b)(6). Data sets to be acquired include Rapid Eye Satellite Images, valued at USD\$ (b)(6) and Aster Satellite Images, valued at USD\$ (b)(6) scene size. Other data sources may be acquired through open public access.



**Software and Reference Materials:** We have budgeted (b)(4) p.a. for software and reference materials to produce the quantitative models.

**Computers:** We have budgeted (b)(4) in Y1 for two computers capable of processing large amounts of data (MacBook pro 15-in x2).

**EHA Malaysia Office Expenses:** We have budgeted (b)(4) p.a. for operational expenses in the EHA Malaysia Office.

**Communications:** We have budgeted (b)(4) p.a. for telephone, wireless SIM cards in country, Internet access, Skype credit, and Go-To meetings.

**Procurement plan:** EcoHealth Alliance complies with all aspects of the procurement guidelines set forth by 22 CFR Ch. II (4-1-06 Edition), Part 226 – “Administration of Assistance Awards to U.S. Non-Governmental Organizations”, including section 226.49 (USAID-Specific procurement requirements). In addition, as a low risk, federally audited institution, we have observed strict policies on procurement throughout our history as an organization receiving federal funding from (b)(4). This includes using a competitive bidding procedure for large items, and actively seeking alternatives to all suppliers, seeking rental rather than purchase where appropriate and a range of other strategies that we engage in to reduce potential waste of resources.

**Cost Share:** Cost Share (at greater than 10%) funds will come from core unrestricted funding to EcoHealth Alliance from non-federal sources. All cash and in-kind contributions will meet the criteria set forth in 22 CFR 226.23 and other OMB cost principles. Cost-share will be composed of in-kind salary support for 1 month p.a. for Drs. Daszak, (b)(6) (b)(4) in total) and in-kind salary support for 1 month (b)(6) (b)(4) who is a (b)(6) with extensive USAID grants administration experience (see CV, Technical application, Annex B). We propose to add additional trip to Malaysia per year at (b)(4) per year for Stakeholder Coordination Lead. **Total cost share will be** (b)(4), representing (b)(4) support as listed above, an (b)(4) p.a. in-kind contributions from Sabah Wildlife Dept. (below).

**Financial and in-kind contributions of all implementing organizations:** In-kind contributions totaling (b)(4) will be made available by the Sabah Wildlife Department, including salary (b)(6) months; (b)(6) support staff, (b)(6) months), travel support and drivers for visitors to DEEP FOREST field sites. This contribution is part of EHA’s cost share plan.

**Potential contributions of non-USAID or private commercial donors:** During this project we will seek in-kind and other contributions from the private sector, including stakeholders that we have already engaged. We expect that these will be small in the first year of the project (approximately \$5,000), but develop



significantly as the project progresses, so that the overall in-kind or direct contributions from the private sector would exceed \$50,000. We will use the Center of Excellence in Sabah to host regular roundtable events for corporate representatives in the region from each sector, including agricultural (IOI Corp, TH Group, Kwantas Corp and Selangor Agriculture Development Board, the Rubber Industry Board, Rubber Settlement Scheme, Malaysian Cocoa Board, Tech Guan Cocoa company). We will invite our current corporate partners including Mars, Cargill, PepsiCo and others that are active in Southeast Asia to these meetings, and will propose development of projects that analyze health risks to their workers and corporate sustainability projects around the EID threats from land use change. We envisage seeking funding from our corporate partners to then trial out our toolkits, and develop small-scale on-the-ground tests of our approaches.

## F. Indirect Costs

We will take our federally approved indirect cost of (b)(4) on all direct costs. In addition, University of Malaysia Sabah and Sabah Wildlife Department have each taken an (b)(4) overhead on their subcontract, consistent with rules that EcoHealth Alliance has adopted for international subcontracts, developed following National Institutes of Health guidelines.

Total EcoHealth Alliance budgeted indirect cost is (b)(4)

## University of Malaysia Sabah Budget Narrative

### Contractual

**Personnel:** Center of Excellence Director (b)(6) will contribute (b)(6) to work with Senior Personnel and local partners to establish the Center for Development and Health at UMS. She will also facilitate workshops and mentor graduate students working under this project. Note that no salary will be provided by USAID under the proposed budget.

**Office Costs:** (b)(4) p.a. is requested to cover the costs of office materials, telephone use, and the use of space at the university.

**Travel:** We have budgeted (b)(4) for travel, which includes reimbursement for travel to Bangkok (\$204 flight, \$245 (\$146 hotel, \$103 meals) and accommodation costs for (b)(6) (\$204 flight + (b)(6) \$146 hotel + (b)(6) \$103 M&IE + (b)(6) 75% of \$103 M&IE = (b)(4)). **Other Direct Costs:** We have budgeted \$ (b)(4) for quarterly meetings (\$ (b)(4) per meeting (b)(4) which includes travel for stakeholders, meals and accommodation). We have budgeted (b)(4) for promotional materials, including purchase supplies and production costs for brochures, handouts and other educational/promotional documents. Meetings will be held over (b)(4) (this may increase as the

engagement with local stakeholders grows and meetings are used, in part, for public and local stakeholder outreach). We anticipate that most attendees will come from or near to Kota Kinabalu, Sabah, though we anticipate that some will come from more remote areas may incur travel costs and require overnight accommodation and a meal allowance. Lunch will be provided to all participants for both days.

**Indirect:** University of Malaysia Sabah has taken (b)(4) overhead consistent with rules that EcoHealth Alliance has adopted for international subcontracts, developed following federal guidelines.

UNIVERSITY OF MALAYSIA SABAH		
(b)(4)		(b)(4)
(b)(4)	TRAVEL	
	TOTAL TRAVEL	
	KUL<->BKK	
	OTHER DIRECT COSTS	
(b)(4)	Office costs	
(b)(4)	Annual Meetings	
	(b)(4) per meeting	
	Promotional Materials	
	TOTAL OTHER DIRECT COSTS	
	TOTAL DIRECT	
	INDIRECT (b)(4)	
	TOTAL	



## Sabah Wildlife Department Budget Narrative

### Contractual

**Travel:** We have budgeted (b)(4) for travel, which includes reimbursement for travel to Bangkok (\$204 flight, \$245 (\$142 hotel, \$103 meals) accommodation costs for (b)(6) = (b)(4). Other Direct Costs: We have budgeted (b)(4) for Sabah Wildlife Department to host an annual Conference on Conservation and Land Development which will serve to bring together scientists policy-makers, stakeholders, and community leaders from Sabah, Sarawak, and Peninsular Malaysia to discuss current findings from IDEEAL and other relevant land use studies, as well as to discuss strategies for mitigating health and conservation impacts of land development. This is critical to our goals in providing a bridge from the modeling and on-the-ground science to policy, as requested in the RFA. This will be a larger, distinct meeting from the quarterly meetings at the Center for Development and Health and used as a means of broader outreach to stakeholders beyond Sabah.

We have budgeted (b)(4) for training and education of SWD staff. This will include travel and cost of attendance at CDH workshops and courses (b)(4) @ (b)(4) per course = (b)(4); attendance at meetings nationally (b)(4) on Peninsular Malaysia, for (b)(6) \$300 airfare + (b)(6) \$165 hotel + (b)(6) \$92 M&IE + (b)(6) 75% of \$92 M&IE = (b)(4); cost of attendance of an international conference annually in the USA (NCEAS Conf.) or Europe for one person for (b)(6) \$3,000 airfare + (b)(6) \$180 hotel + (b)(6) \$66 M&IE + (b)(6) 75% of \$66 M&IE = (b)(4); travel to the US (New York) to learn GIS and analytical skills from the EHA modeling team so that we can ensure project sustainability in Sabah after the end of the IDEEAL program (b)(6) duration, for one person: \$2,241 airfare + (b)(6) \$241 hotel + (b)(6) \$71 M&IE + (b)(6) 75% of \$71 M&IE = (b)(4).

**Indirect:** Sabah Wildlife Department has taken (b)(4) overhead consistent with rules that EcoHealth Alliance has adopted for international subcontracts, developed following federal guidelines.

SABAH WILDLIFE DEPARTMENT		
		(b)(4)
TRAVEL		(b)(4)
TOTAL TRAVEL		
OTHER DIRECT COSTS		
Annual Meetings	Conference on Conservation & Land Development	
Training & Education		

TOTAL OTHER DIRECT COSTS		(b)(4)
TOTAL DIRECT		
INDIRECT (b)(4)		
<b>TOTAL</b>		



**Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL)**

**In response to USAID-RDMA-RFA-486-13-000001**

**May 24, 2013.**

**EcoHealth Alliance  
460 West 34<sup>th</sup> Street,  
New York, NY 10001  
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**Administrative Point of Contact:**

(b)(6)

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+(b)(6)



## II. Table of Contents

I.	Title Page	1
II.	Table of Contents	2
III.	Executive Summary	3
IV.	Goal and Objectives	4
V.	Narrative	5
	A. Technical Approach	5
	i. Table of partner organizations in Sabah	14
	ii. References	17
	B. Proposed Outcomes/Results	17
	C. Management Plan and Key Personnel	20
VI.	Annex A	24
	i. Implementation Work Plan and Time Line	25
	ii. Monitoring and Evaluation Plan	42
VII.	Annex B: Resumes for Key Personnel and Long-term Professional Staff	50
	i. Peter Daszak	51
	ii. (b)(6)	55
	iii. (b)(6)	59
	iv. (b)(6)	63
	v. (b)(6)	67
	vi. (b)(6)	71
	vii. (b)(6)	74
	viii. (b)(6)	77
	ix. (b)(6)	80
	x. (b)(6)	83
	xi. (b)(6)	86
	xii. (b)(6)	90
	xiii. (b)(6)	93
	xiv. (b)(6)	95
	xv. Signed Letters of Commitment from Key Personnel	97
	xvi. References for Key Personnel	104
VIII.	Annex C: Institutional Capabilities and Partnerships	108
	i. Letter from Malaysian Palm Oil Council	121
	ii. Letter from Hospital Queen Elizabeth	122
	iii. Letter from HUTAN	124
	iv. Letter from LEAP	125
	v. Letter from Danau Girang Field Center	127
	vi. Letter from Department of Veterinary Services Malaysia	129
IX.	Annex D: Relevant Past Performance Information	131
	i. PREDICT - Wildlife SMART Surveillance	131
	ii. Risk of Viral Emergence from Bats	133
	iii. HSD: Collaborative Research: Human Related Factors Affecting Emerging Infectious Diseases	135
	iv. EcoHealthNet: Ecology, Environmental Science and Health Research Network	136
	v. The Ecology, Emergence and Pandemic Potential of Nipah Virus in Bangladesh	137

### III. Executive Summary

Disease emergence is driven by complex socioeconomic and environmental changes, which include land use changes due to deforestation, agricultural expansion and habitat degradation. EcoHealth Alliance (EHA) has spent the last 40 years addressing these complex environmental and social challenges through multidisciplinary collaborative international networks. These include long-term partnerships within Malaysia, such as our 15-year old partnership with the Malaysian Government to tackle Nipah virus (the Henipavirus Ecology Research Group) which has now been formalized at the Ministerial level by an MOU among EHA, and the Malaysian Ministry of Health, Dept. of Veterinary Services, and Wildlife and National Parks (PERHILITAN). For the IDEEAL project, we will leverage our experience building successful partnerships, developing outreach programs, and our specific expertise in modeling disease emergence and its economic implications to address the challenge in this RFA.

Our modeling strategy will draw on existing datasets curated by EHA, datasets identified through partners and government agencies in Malaysia, and new data collected through the DEEP FOREST project, managed by EHA. Using a Bayesian statistical framework, we will examine how changes in land cover and land-use has affected the incidence of disease over the last few decades. We will calculate the value of damages from past disease outbreaks, and construct a model for expected damages under different land use scenarios, and different severity of outbreaks. We will parameterize our models with data that explicitly measure the different rates of exposure to disease by men and women (of all ages) attributable to gender-specific roles in society. To address gender issues effectively, we will solicit the direct participation of women and children in our behavioral surveys to clarify the implications of gender-specific roles.

We will develop a center of excellence for economic analysis of land use change and health outcomes. The Center for Development and Health (CDH) will be an international resource for the science and policy of land use change and the cost of disease emergence and will be based at the School of Business and Economics at the Universiti Malaysia Sabah (UMS). The CDH will be a forum for a state-of-the-art multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, agriculture, forestry, wildlife conservation, and health as well as industry experts involved in land development in Sabah. We will collaborate with these experts to develop outreach materials and strategies, and the CDH will serve as a platform from which we will disseminate information and toolkits that provide all relevant stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate the science into action, with particular consideration for gender sensitive issues.

At the end of the project period, we will have produced four main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications 2) the Center for Development and Health at UMS to serve as a permanent Center of Excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impacts toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific translation communications toolkits that translate research and modeling results to be useful for policy makers, private companies and government organizations, and civil society stakeholders.

#### IV. Goal and Objectives

**Overall aim:** In partnership with the Universiti Malaysia Sabah School of Business and Economics, the Sabah Wildlife Department, and other governmental and non-governmental stakeholders, we will develop a functional, field-trialed, quantitative set of models which capture gender sensitive emerging infectious disease-related health savings as a function of land use; produce actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and establish a training, learning, and resource sharing platform in Sabah to sustain program impacts after the project.

Models will be parameterized using empirical data from our extensive collection of datasets as well as other existing datasets and new data generated by USAID investments including EPT PREDICT and our DEEP FOREST project. We will create a Center of Excellence in Sabah to act as an outreach resource for key stakeholders in Sabah, Malaysia, and USAID. The Center will disseminate our findings and actively communicate them to local stakeholders including women's groups and indigenous communities who may be directly impacted by land use change. We will work directly with government partners in Sabah and industry stakeholders to translate the outputs of our models into policy-level actions and corporate sustainability strategies that will reduce the risk and mitigate the impact of land-use and climate associated zoonotic disease outbreaks, with particular attention to reducing gender-based adverse health events. This project will be scalable and will serve as a prototype for similar national and regional initiatives in other parts of Asia or the world that are particularly vulnerable to EIDs.

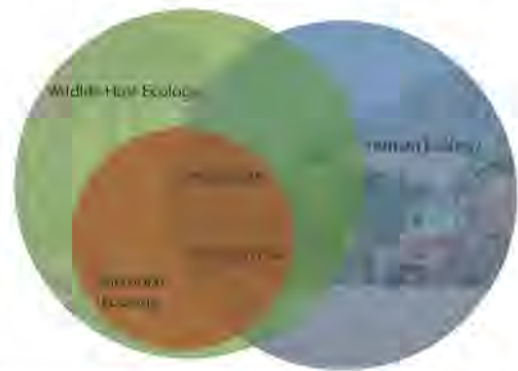


## V. Narrative: Section A - Technical Approach

(b)(4)

Disease emergence is driven by socioeconomic, demographic and environmental changes which include deforestation, agricultural expansion, habitat degradation and other land use changes. These changes are particularly important for zoonotic diseases, which account for [redacted] of all EIDs, and almost all recent pandemics (Taylor *et al.*, 2001; Woolhouse & Gowtage-Sequeria, 2005). Land use change is the most significant driver of disease emergence. Analysis of our database of all known EIDs (from Jones *et al.*, 2008) shows that around one-fifth of EID events, an even higher proportion of zoonotic diseases, and most emerging pandemics were associated with land use changes, including agricultural conversion, deforestation and activities associated with the extractive industries (e.g., mining, logging). The importance of land use change in the process of disease emergence make it a key target for control strategies (Patz, Daszak *et al.*, 2004; Jones *et al.*, 2008; Keesing *et al.*, 2010; Burnside *et al.*, 2012). However, to create effective control measures requires: 1) a detailed mechanistic understanding, supported by field data, of how land use change drives disease risk; and 2) a strategy to control this problem that will be supported by local stakeholders (industry, government and local communities) because these stakeholders play a role in promoting, legislating or engaging in activities that lead to land use change, and are vulnerable to their adverse consequences, including disease emergence.

Our extensive previous work on modeling EID dynamics; on the emergence Nipah virus, West Nile virus, SARS and avian influenza; and our current work in USAID EPT PREDICT (including the DEEP FOREST project) provide strategic direction for this proposed. We have shown that land use change leads to disease emergence by increasing opportunities for contact and pathogen spillover between wildlife and humans and by perturbing host-pathogen ecological dynamics that promote cross species transmission (Patz, Daszak *et al.*, 2004; Murray & Daszak, 2013)



(Figure on right). These factors act either together or independently, and because of the diversity of reservoir hosts, vectors, and human behavior in a region, they create a complex, dynamic system.

To understand this complexity requires collection and analysis of data on all of the processes involved in land use change that affect disease risk. For example, road building or other economic development activities in intact forests usually involve movement of people into previously uninhabited areas, which increases their contact with wildlife and their exposure to the novel pathogens they carry, as well as vectors such as mosquitoes. Different sectors of the community tend to have different types and degrees of contact with wildlife, and this also varies with age and gender. In addition, land use change modifies existing habitat with often dramatic impacts on the abundance of disease reservoirs and vectors (Norris, 2004; Patz & Olson, 2006; Olson *et al.*, 2010). All of these factors can alter disease risk. Once a pathogen has spilled over into a single person, or established itself in a community, the risk of spread depends on the amount and type of contact among people, and their movement into and out of the interface where spillover happened. Finally, assessing the role of disease emergence in the economic cost/benefit analysis of land use change requires specific information on the frequency of disease emergence and outbreaks, and their impact on individuals, on communities and on production,



trade and travel. Our approach for the IDEEAL Project brings together these components to produce actionable information to local and regional stakeholders for informed decision-making.

### **Cross-Disciplinary Approaches**

EcoHealth Alliance (EHA) has spent the last 40 years addressing complex environmental and social challenges by building multidisciplinary teams via collaborative international networks. These include long-term partnerships within the region, such as our 15-year old partnership with the Malaysian Government to tackle Nipah virus (the Henipavirus Ecology Research Group) which has now been formalized at the Ministerial level by an MOU among EHA, and the Malaysian Ministry of Health, Dept. of Veterinary Services, and Wildlife and National Parks (PERHILITAN). Our team has provided multi-disciplinary training, research support, and policy guidance to Sabah Wildlife Department since 1988. Our work in the region includes consortia that we founded such as the One Health Alliance of South Asia, a partnership of SAARC country government agencies for health, agriculture and the environment, and the Consortium for Conservation Medicine, set up in 1997 to link leading US institutions of public health, wildlife health, environmental sciences, medicine and veterinary medicine. Official affiliated partners of EHA ([www.ecohealthalliance.org/partners/all\\_partners](http://www.ecohealthalliance.org/partners/all_partners)) include key government departments in the USA (e.g. CDC, NIH, USDA), in Malaysia (e.g. Dept. Veterinary Services, Sabah Wildlife Dept.) and globally (e.g. OIE, FAO, WHO, and IUCN). We work closely with leading corporations involved in agricultural development in the region (e.g. Cargill, Mars, PepsiCo) and leaders of industry globally (e.g. Bayer, Exxon). Our economics research includes partnership in the NIH-NIGMS MASpread project which analyzes the economic impacts of disease on trade. Our outreach programs include multidisciplinary training programs such as EcoHealthNet, which provides disease ecology training in more than 10 countries. Finally, EHA is one of four partners in USAID EPT PREDICT, with specific responsibility for zoonotic disease surveillance in Malaysia, leadership in all PREDICT modeling activities, and the DEEP FOREST project.

For this project, we will leverage our experience building successful collaborative programs, in public outreach, and our expertise in modeling disease emergence and their economic implications to address the challenge in this RFA. We have already established close working partnerships with experts from the fields of wildlife health, economics, conservation biology, public health, and social advocacy in Sabah, including the Sabah Wildlife Department's Wildlife Health Unit (our DEEP FOREST team), The Danau Girang Field Centre, HUTAN, the Sabah Department of Health, the Malaysian Palm Oil Council, and the School of Business and Economics at the Universiti Malaysia Sabah (UMS).

We plan to create a center of excellence for land use change and health (the Center for Development & Health (CDH) based in the School of Business and Economics at UMS. This will engage experts in agricultural science and policy from within UMS, including the Department of Sustainable Agriculture, and State government experts in economic planning and development from the Sabah Economic Development and Investment Authority (SEDIA) as well as several other local NGOs and government agencies. The CDH will link key departments within the university to private and public institutions in Sabah whose members can provide real-world insight into the challenges of development. It will create training and educational opportunities for men and women, which provides students with a multidisciplinary framework that links environmental and ecological science with economics, social science, and political science. This will provide long-term sustainability by producing a generation of graduates ready to address the challenges of responsible land development in Malaysia and the broader region.



## Modeling strategy

We propose a 3-phase approach, with each phase informing the next: 1) model the relationship between land cover/land-use change and the likelihood of pathogen spillover, disease outbreaks and emergence, utilizing available data and novel data from DEEP FOREST; 2) develop an avoided damages model to understand the economic consequences of these linkages; and 3) examine potential for integration of these models into a total ecosystem value model. Although the focus of this proposal is #1 and #2, we will evaluate the potential to achieve #3 in the early stages of the project. Progress in #3 will place the goals and results of the current RFA in broader context of ecosystem use and contribute to future policy and planning efforts.

### 1. Modeling the relationship between land-use change and disease outbreaks/emergence

This objective will be achieved by analyzing and modeling data from two domains: 1) A detailed analysis of available data; and 2) analysis of newly generated data primarily from DEEP FOREST. The first domain uses a correlative approach and provides insight from a very broad range of data sources while the second focuses in on the mechanisms of disease emergence (primarily contact rate and host-pathogen ecology) to provide novel insights on the links between land-use change and disease emergence.

*Available data:* Our first step will be to examine how changes in land cover and land-use has affected the incidence of disease over the last few decades. We will focus on a range of disease outcomes, including localized spillover events, small outbreaks, larger scale outbreaks and pandemic emergence. We will assess how land use has changed from pristine conditions using historical data on land cover, and we will match this with recent historical data on disease outbreaks and emergence that we have already amassed as part of EHA's modeling program, as well as from other sources. **For land use data**, we will use our datasets on land cover/land use for natural systems, croplands, grasslands, urban areas and areas used for livestock, originally sourced from FAO, HYDE-IMAGE, GLOBIO3, European Commission, USGS, NASA and others, but that have undergone subsequent processing for our applications in studying disease emergence processes. Our spatial database also includes current state, forecasts (2050) and backcasts (1700) of land cover/land use. These datasets are highly variable in spatial resolution, ranging from country level to 500 m of resolution (e.g., classified land cover MODIS-Terra). We have access to downscaled scenarios of land use and climate change under various projected policy frameworks from Rio+20 (e.g., business as usual vs aggressive policy changes). We have also gathered, vetted and produced a series of socio-economic and ecological variables thought to drive disease outbreaks, including global human population density (GPW & GRUMP), gross domestic product (World Bank), mammal diversity (IUCN), human conflict (Political Instability Task Force), climate (WorldClim) and others. Currently we are in the process of designing methods to downscale some of the country level data to finer spatial resolution models, which in pilot analyses significantly enhances our ability to detect trends among noisy and biased datasets. **For disease data**, we will use EHA's online EID database (the 'Sicki Project' – [www.ecohealthalliance.org/programs/35-the\\_sicki\\_project](http://www.ecohealthalliance.org/programs/35-the_sicki_project)), which serves as a platform to enter information on EIDs, including standardized pathogen taxonomy, bibliographical references and spatial information. We will build a database of outbreaks and other relevant information (e.g., drivers of outbreaks) relevant to this RFA. To do this, we will ingest data from public databases such as GIDEON, the WHO Disease Outbreak News reports and from reviewing the literature.

In conjunction with our Malaysian partners and the Center of Excellence, we will also identify relevant local and regional datasets (e.g., government reports or articles in local languages, such as Bahasa-Melayu, Bahasa-Indonesia, Mandarin and Cantonese).

To account for temporal variability in emergence, we will perform analyses at different temporal and spatial scales. For the temporal analysis, 10-year intervals will be used. We will also investigate the possibility that there is a time lag between land cover/land use changes and the emergence of new infectious diseases. In this scenario, a change in land use may gradually alter population dynamics of a wildlife reservoir, so that after a period of time, some wildlife become much more common, and their pathogens have an opportunity for spillover. The spatial analysis will include a multi-scale analysis focused on regional (Southeast Asia) and local (within Sabah) spatial scales. This framework of analysis will allow us to separate drivers of EIDs operating at different scales.

*New data:* For the second component of this objective, we will leverage the theory, methodology and results of the DEEP FOREST project to bolster and support the current proposal. Spillover of pathogens due to land use change is an ecological process based on the community ecology of pathogens within wildlife populations, and their interactions and disease-relevant contact with people. Contact rates are notoriously difficult to acquire during disease outbreak situations. However, the EHA-led DEEP FOREST project is tasked with specifically measuring disease-relevant contact among people, livestock and wildlife across an urban-to-rural gradient in Sabah. It also will capture data on the community ecology of wildlife hosts over this gradient.

We will use data obtained by the DEEP FOREST team to inform the likelihood of EID spillover within specific regions undergoing land use change. In Borneo, the DEEP FOREST project sites are in the region of Sukau near one section of the Kinabatangan River. The sites are distributed along a disturbance gradient from highly disturbed (near the town of Sukau) to largely pristine and intact (Gomantong Forest Reserve). Here, wildlife sampling and surveys of human contact with wildlife are taking place at 9 sites along the gradient (3 sites in each of three levels of the gradient). These surveys provide samples that are being fed into our PREDICT pathogen discovery program to provide information on the prevalence/incidence of known pathogens and completely novel pathogens from viral families which are known to contain zoonotic agents. DEEP FOREST human contact surveys will provide critical information on how likely a person is to make contact with wildlife directly, indirectly or inadvertently, and depending on age, occupation and gender. This gender specificity may be critical because some occupations consist of mainly male workers (e.g. palm oil plantations, hunters), and we expect exposure rates to differ significantly both quantitatively and qualitatively between men and women.

These data will inform our model of the likelihood of pathogen spillover for a given contact pattern, corrected for the patterns we expect to see in the viral pool across the land-use change gradient. This means that we will be able to compare the likelihood of an individual hunted animal being positive for a pathogen at any site along the gradient, and of a specific risk behavior occurring there. Finally, to calibrate the likelihood of such a scenario leading to infection of a person, we will use data from published studies of zoonotic spillover for various model viruses. **This level of predictive capacity has never been achieved before, and is uniquely possible by a group that brings together expertise in modeling EIDs and has access to the unique datasets that DEEP FOREST will produce.**

*Statistical framework:* We will evaluate and compare regression models used to analyze count data (e.g., negative binomial, Poisson, zero-inflated under a hierarchical Bayesian framework) while controlling for other factors (including research bias) that influence disease detections. We will make use of the following general Bayesian model:

$$\begin{aligned} Y_i &\sim \text{Poisson}(\mu_i) \text{ or } Y_i \sim \text{Binomial}(\mu_i) \\ g(\mu) &= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \varepsilon_i \\ \varepsilon_i &\sim N(0, \sigma_\varepsilon^2) \end{aligned}$$

where  $g(\mu)$  is a link function (see below),  $\beta_0, \beta_1$ , etc., are parameters to be estimated and  $\varepsilon$  is an error term with a normal distribution. Link functions are used to indicate whether the predictor variable ( $Y_i$ ) represents a Poisson distribution (e.g., outbreak counts) or a Binomial distribution (e.g., presence or absence of a new disease). Links are defined as  $g(\mu) = \log(\mu)$  for count data (e.g., number of outbreaks) or as  $g(\mu) = \log\left[\frac{\mu}{(1-\mu)}\right]$  for presence/absence data (an EID event).

Bayesian analysis has the advantage over frequentist methods under some circumstances for its ability to specify *prior* probabilities to parameters (e.g., through literature reviews and consultation of experts). We will assign prior probabilities using two different approaches: 1) Uninformative prior: an inverse gamma distribution will be assigned for each parameter. An uninformative prior approach will help us develop a generalizable model and make it relevant for other parts of the world where disease-related data may be scarce. 2) Informative prior: to achieve greater specificity and regional relevance, we will investigate the use of additional sources of information for integration into this framework. For example, we may be able to leverage a range of data sources from the literature, from our DEEP FOREST project, and EID emergence and outbreak databases. Bayesian models with informative priors can help make the most of available data, narrow parameter estimates, reduce uncertainty in those estimates, and reduce new data requirements (i.e., sample sizes) in order to achieve equivalent statistical power for inference. For example, they will give us the advantage of being able to incorporate system-specific data that we have collected under our other programs in order to produce a tailored Bayesian model for regional and local conditions. Markov Chain Monte Carlo (MCMC) methods with a Gibbs sampler algorithm (i.e., each randomly sampled value is conditional to the previous value) will be used to estimate the posterior probability of the mean and percentiles.

## 2. Avoided damages modeling

Our preliminary analyses and other studies strongly suggest that deforestation and other land-use practices contribute to disease emergence and outbreaks. Intact forests can thus be considered a ‘public good’ from a disease emergence perspective – that is, they provide a service to society through protection against infectious disease outbreaks. Unlike harvesting natural products for use or profit, this service does not involve society’s direct use of the ecosystem, making the valuation of this public good a challenge. One way to measure the benefits of disease regulation from intact forests is to *value the damages that are avoided* by keeping the ecosystem intact (Groot *et al.*, 2010). In practical terms, we expect that the costs of disease control will increase with deforestation, i.e. with decreasing forested area, and we will examine this relationship in the proposed work.

### *Calculating the Expected Damages of Disease Outbreaks*

Our approach is based on work EHA has developed within our MASpread project in which we are examining the anthropogenic impacts that contribute to the spread of disease and their



associated costs. This involves adapting the concept of hedonic pricing models (models that decompose the price of an item into separate components) to value EID damages. We use a set of well-studied emerging diseases each with different characteristics representing typical impacts from disease emergence – i.e. those causing spillover vs. human-to-human transmission vs. pandemic outbreaks. Our damage functions are assessed by teasing apart the wide range of potential outcomes of these diseases into their morbidity, mortality, and impacts on travel and trade – i.e. factors that have already been valued in separate studies. Our strategy is to then use that function to predict the damages of other diseases that have similar characteristics to different members of this subset based on the same explanatory variables.

A general description of this model takes the form of:

$$D_i = \alpha + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni} + \varepsilon$$

Where:

$D_i$ =Damages from disease i in 2013 US dollars

$X_{1i}$  to  $X_{ni}$ = Morbidity, mortality, loss of worker days, duration trade restrictions, etc.

$\beta_1$  to  $\beta_n$  are estimated parameters representing the effect size of each variable (X) on the damages

$\varepsilon$  = error term

Our categorization of EIDs by type of economic damages, and derivation of a different damage function for each category make our estimates more robust. Using the results from the count data model (see 1 above), we will examine the expected damages under three different scenarios: 1) business-as-usual (current rate of land use conversion extrapolated forward), 2) increased rates of deforestation, and 3) no deforestation. We will link these scenarios to the new Millennium Ecosystem Assessment policy scenarios.

We will tailor damages from the above formula (listed in 2013 US dollars) to the unit with the most impact for the system and stakeholders we are addressing (e.g., USD, Thai Baht or Malaysian Ringgit). Generally speaking damages will include the direct costs associated with human health impacts and mortalities, as well as other costs such as impacts on travel and trade.

*Health impacts:* We will quantify the ‘value’ of health, healthiness or the perception of healthiness using a value of statistical life (VSL) and value of a statistical life year (VSLY) framework, i.e. typical inputs into cost-benefit analyses (CBA). VSL is the marginal dollar value attributable to a human life, while VSLY is the annualized equivalent (value of a year of healthy life). VSLY will be particularly relevant here because damages are often non-fatal and this measure encapsulates loss due to disability or other reduction in quality of life over a fixed time period. As a starting point, we will work from previous estimates of these parameters. These exist mainly for high-GDP countries in Europe, North America and elsewhere and we will therefore adapt them to local conditions. A previous review (from Australia) suggests a mean VSL of ~A\$9.4 million (median of \$6.6M), and a mean VSLY of A\$433,437 (median of A\$119,589). These mean figures are also affected by sector, e.g. health (A\$4.0 million), transport (\$7.9 million), ‘other’ (consumer choice, crime and fire safety – \$8.5/\$6.0 million), environment (\$11.2/\$8.1 million) and occupational safety (\$11.1/\$7.4 million), highlighting the need to understand the human population in the area of study if we are to attribute economic values to disease emergence due to land use change.

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Healthy life is a unique and valuable commodity, which does not fit easily into more traditional economic benefits frameworks. For this reason, several metrics have been developed that can attribute costs to specific subcategories (e.g., infectious diseases). These include fatalities averted/life-years saved (LYS), and several quality of life metrics (QoL e.g., DALY – disability adjusted life years, and QALY – quality adjusted life years). Both DALYs and QALYs incorporate mortality and morbidity components. DALY valuation is the preferred approach here due to its extensive use in previous studies and because a pre-existing framework based on expert weights of various health states is available. A DALY value of 0 equates to perfect health, such that DALYs are already in the form of something to be averted.

*Other damages:* The economic impact of a disease outbreak often extends beyond losses from morbidity and mortality. SARS claimed 774 lives out of 8,096 infected, but the majority of the economic burden (perhaps as high as US\$30-50 Billion) resulted from losses in the travel and trade sectors (Keogh-Brown 2008). For each outbreak, depending on its scope (local, national, multi-country), we will gather data on a variety of other indicators that contribute to the overall economic burden of the disease. These may include treatment costs, the number and value of livestock culled in control measures, travel and trade restrictions and other relevant costs.

### 3. Total Ecosystem Value Modeling

Although the RFA does not call for quantification of the total ecosystem value (TEV), the avoided costs calculated in our model could be incorporated into other models to determine the economic and societal value of converting land (adapted from Barbier, 2009). This will have particular relevance to policy makers in Malaysia and elsewhere in Tropical regions under pressure for development.

$$\max_{c(t)} V = \int_0^{\infty} [R(D) - C(c) - B(A) - O(A)]e^{-rt} dt$$

Where:

- R – rent from converted land
- C – cost of conversion of intact land to developed land
- B – benefit from intact ecosystem
- D – developed land
- c – area of land converted in each period
- A – undeveloped/intact land
- O – avoided cost of disease outbreaks

$O'(A) < 0, O''(A) < 0$  as intact land decreases, the cost of an outbreak increases at an increasing rate.

### Generalizability

We anticipate that the results generated from our approach will represent a significant addition to the state of the knowledge on the value of a specific ecosystem's disease regulating services. The tools that we develop above will have the potential for widespread adoption, providing it is correlated to local conditions. We will therefore develop a checklist to accompany the tools that will contain information on how to tailor the models to different regions and different types of

ecosystems based on our recent research on the spatial drivers of emerging diseases. For example, we have analyzed all previous 450 EID events to assess the relative role of land use change in driving their emergence, and how this varies in importance in different regions globally. These data were published in our paper on biodiversity and health in *Nature* (Keesing *et al.*, 2010) and will be made available with the tool. Similarly, for our models to have relevance to other regions (e.g. South America, Africa), data will be required on how human contact and pathogen diversity patterns vary with land use change in these regions. Data from DEEP FOREST Uganda and DEEP FOREST Brazil, as well as our IDRC-funded project in Southern Brazil, will be available to make these correlations.

### **Gender Specification**

Men and women experience the risks and costs of infectious diseases differently. This likely has specific relevance to land use change, especially with regards to extractive industries, with manual labor health costs, and the economic benefits of work largely falling to men and social and environmental costs falling to women. In many regions, gender also determines one's access to resources, particularly land. The DEEP FOREST Human Contact (DFHC) surveys are providing information we can use to assess gender specific risks and costs of disease along a land-use change gradient. These surveys were designed as part of a collaborative project between EPT PREDICT and PREVENT and are being rolled out at our DEEP FOREST sites in Sabah, Brazil and (in the first year of this project) in Uganda. In Sabah, we hypothesize that the specific costs of disease to individuals, as well as to the economy, will be gender-specific. For example, although men and women often work in the same places, women are often concentrated in distinct sectors or are responsible for distinct activities exposing them to different risks compared to men. Division of labor, recreational activities and occupations related to animals (hunting, butchering, caring for domestic animals, etc.) are also influenced by social factors. Similarly, men are often engaged in manual labor activities in areas away from urban centers. For example, in Sabah there is a strong bias towards male workers in oil palm plantations, which may expose them to specific hazards associated with this form of land-use change.

Our working hypothesis will be that men and women have different rates of exposure to diseases that may be attributable to gender-specific roles in society. To address gender issues effectively, we will solicit the direct participation of stakeholders including women to clarify gender roles and their implications in project activities. Quantitative data collected from the contact surveys will be disaggregated by gender to highlight the differences in traditional roles and learned behaviors of men versus women based on gender attributes. Gender-specific analyses will also take into account other variables including income, race, ethnicity, and other social characteristics, as well as explicitly address the specific differences between young girls and boys, and adult women and men. To assess the effect of both gender and age on relative risk of infectious disease emergence, the following sub-groups have been chosen to survey as part of the DEEP FOREST project: Adult women (age 18 and older); Adult men (age 18 and older); Boys (age 10-14); Girls (age 10-14). We will liaise closely with the USAID EPT PREVENT team that is conducting this work collaboratively with EHA in Borneo.

Using gender-relevant information from the DEEP FOREST surveys, we will examine: Knowledge, beliefs, and perceptions; what beliefs and perceptions shape gender identities and norms; human practices and distribution of labor – what are the gender roles that dictate the activities in which men and women participate; how men and women engage in different activities relevant to land use change and rates of exposure to different animals; and time and

space – how women and men spend their time. Understanding the role of gender in disease risks and costs will be fundamental in planning the prevention, detection and treatment of illness.

In addition to the gender specified data collected from the human contact surveys, additional data will be collected from stakeholders and used to inform the gender-sensitive health impacts toolkit to be produced. Additional data may include: local legal and cultural frameworks with regard to land ownership, community leadership; possible impact on local gender relations; barriers and facilitators of gender sensitive data collection; and levels of female participation in decision-making structures. Additional data collection methods may include community mapping, stakeholder analysis, focus groups, and key informant interviews with women, local government, and representatives from the private industry.

## **Outreach**

### **Stakeholder engagement**

We will develop a stakeholder engagement program around the principle that decisions on land use management that minimize EID spillover risk can contribute to widely distributed health savings. These occur due to averted disease control and containment costs; avoided costs of individual health care; avoided costs to livestock health and productivity, trade and tourism status, financial markets stability; and the preservation of individual, gender-sensitive livelihoods and earnings potential. Our engagement will build upon 1) existing partnerships established in Malaysia (and Sabah in particular) through EHA's work with our DEEP FOREST project, the USAID EPT PREDICT program, and our 11-year partnership with the Malaysian Govt. and other agencies; 2) the organizations we have identified and contacted for the purposes of developing this proposal, and 3) organizations working with the above agencies and partners on other related programs. Stakeholders will include government agencies (both Sabah State and Federal) for wildlife, forestry, agriculture, development, tourism, public health, and social development. Para-governmental and Non-governmental organizational stakeholders will include Yayasan Sabah (Sabah Foundation), the Malaysian Palm Oil Council, Forest Research Centre Sabah, Sabah Women's Action-Resource Group, and the Sabah Tourism Association, The LEAF (Lowering Emissions in Asia's Forests) Program and its relevant partners such as The Centre for People and Forests. Additional private sector stakeholders will be identified by existing partners, their industry organizations (such as above) and those working in communities surrounding project activity sites (e.g. tourism companies, logging companies, plantation managers and owners, livestock and small-holder farmers, health clinics, shop owners, restaurant owners, lodging and logistics, etc.). University stakeholders will include Universiti Malaysia Sabah and the members of the Malaysia One Health University Network (MYOHUN).

The goal of our stakeholder engagement will be (in both phases of the project) to improve relevant data (knowledge) acquisition and to establish target audiences and users of the project so that we can disseminate data and findings, models, tool kits and handbooks, organizational platforms, and other deliverables. Early in Phase 1 of the project, stakeholders will be identified, briefed on project goals and invited to participate. In partnership with the Sabah Wildlife Department, following the release of the RFI, we have already held an initial informational meeting to identify interested parties and discuss the concept of the center of excellence. This has allowed us to better understand the stakeholder landscape and to identify potential sources of data for use in our modeling activities. If funded, we will organize our first formal meeting(s) of stakeholders within 4 months of project initiation, and schedule regular (quarterly) meetings and

sub-group meetings out of that initial gathering. Stakeholder identification and inclusion will continue through the life of the project. We will use facilities at the Universiti Malaysia, Sabah to arrange and hold stakeholder meetings (see Center of Excellence).

#### **Table of partner organizations in Sabah**

<b>Organization Name</b>	<b>Role</b>	<b>Key contacts / names</b>
Sabah Wildlife Department	Provide data on biodiversity, land use, DEEP FOREST	(b)(6)
Department of Agriculture	Data on land conversion, crop production	Director
Sabah Forestry Department	Data on Forest cover and historically cleared land	Director
Sabah Parks	Data on protected land	Director
Yayasan Sabah	Timber concession data and educational outreach expertise	(b)(6)
Malaysian Palm Oil Council	Coalition of large-scale Oil Palm Plantations	(b)(6)
Malaysia Palm Oil Board	Malaysian Govt. Agency overseeing Oil Palm industry	Director
School of Business and Economics, University of Malaysia, Sabah	Center for Development and Health	(b)(6)
SEDIA (Sabah Economic and Development Investment Authority)	State agency responsible for development and economic growth	Director
World Wildlife Fund - Malaysia	Conservation NGO	(b)(6)
HUTAN	Conservation and social responsibility NGO	(b)(6)

#### **Public-Private partnerships**

We plan to develop a powerful public-private partnership that produces multiple initiatives of mutual benefit – whereby industry advises our model building on the details of land-use change projects, and we advise industry and our government agency and other private partners on risk of disease outbreaks and emergence. EHA has extensive experience working in exactly this role in the region and we have developed working or growing relationships with government



authorities, academia, the private sector (e.g. the Malaysian Palm Oil Council <http://www.mpoc.org.my/>, and the relevant regulatory/watch-dog groups, such as the Roundtable on Sustainable Palm Oil <http://www.rspo.org/>) and local government agencies such as the Sabah Department of Health and the new Sabah Wildlife Department Health Unit, which EHA helped build in 2012. We will leverage these partnerships in both Phase 1 and Phase 2 of the project and have garnered letters of support from our main partners.

Collaborating with the private sector is essential to any initiative that hopes to influence policy and community involvement. It is particularly important in this project because government and industry partners are both involved in the activities that drive EIDs and also suffer from their impacts. Engaging industry partners such as the palm oil sector from the beginning will allow us to draw on their expertise and minimize potential conflicts as new activities and policies evolve. EcoHealth Alliance, in partnership with Chatham House and USAID, recently facilitated a roundtable discussion with key extractive industry stakeholders to present the current state of science linking natural resource industries and infectious disease emergence. We found that industry representatives were highly receptive to our characterization of disease emergence scenarios, in particular where they create health threats to their worker, and negative public perception of the industry. Similarly, our experience consulting for other global industry leaders including the food sector (e.g. Cargill, Mars, PepsiCo), the agricultural sector (e.g. Bayer Crop Science) and consultancy services (e.g. McKinsey & Co.) demonstrates that industry is a willing partner in initiatives that produce a fair evaluation of risk, particularly when we can advise companies directly on health threats to their workers, or threats to the public perception about their business. We have used these experiences to develop our engagement strategy. For this project, we will aim to garner financial support and in-kind contributions from the private sector to assist in the longterm sustainability of the project outreach. At EHA, our approach to this has been to build a relationship with the companies, trade groups and other private sector institutions of relevance, and assist them in developing their corporate sustainability programs in a way that benefits people on-the-ground in regions where they have active production facilities. This is the approach we have used previous with Bayer, PepsiCo, Exxon, Cargill and others, and our initial discussions with Malaysian Palm Oil Council have been encouraging about their financial support of projects that would fit under the IDEEAL program.

Utilizing the Center of Excellence in Sabah (discussed below) we will host regular roundtable events for key players in the region from major commercial agricultural industries such as palm oil (the Malaysian Oil Palm Council, IOI Corp, TH Group, Kwantas Corp and Selangor Agriculture Development Board) rubber, (the Rubber Industry Board, Rubber Settlement Scheme) and cocoa (Malaysian Cocoa Board, Tech Guan Cocoa company). At these meetings, we will leverage relationships with our current partners including Mars, Cargill, PepsiCo and others that are active in Southeast Asia to develop projects that incorporate data on EID threats to their workers, and on their activities in the region. We will mutually develop plans with private partners to trial out our toolkits, and develop small-scale on-the-ground tests of our approaches. We envisage that this will include working with data on population exposure to wildlife at sites where individual partner companies are actively working and developing. These partnerships will help ensure long-term sustainability of both data collection, research, and implementation of best practices, and the continued development of the proposed center of excellence. We will also investigate in collaboration with key government and industry stakeholders the potential for leveraging other market-based initiatives that could strengthen the protection of carbon stocks, biodiversity, health and other social objectives (e.g., REDD+).



### **Center for Development and Health (CDH)**

We will develop a center of excellence for economic analysis of land use change and health outcomes. The Center for Development and Health (CDH) will be an international resource for the science and policy of land use change and the cost of disease emergence and will be based at the School of Business and Economics at the Universiti Malaysia Sabah (UMS). The CDH will be a forum for a state-of-the-art multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, agriculture, forestry, wildlife conservation, and health as well as industry experts involved in land development in Sabah. Scientific experts and policy makers will hold roundtable discussions with industry leaders and discuss project findings and current land use practices in order to create guidelines on how to reduce the risks of disease emergence as a consequence of land use change and development.

By generating robust quantitative models of the cost of disease emergence and interventions and serving as a repository for data related to development and land use change, the Center will aim to establish a reputation for being an international leader on this subject. In order to translate the findings of this project into actionable policy, the CDH will develop communication and outreach strategies, including a website and social media, and we will work with local public and private partners to disseminate project findings to stakeholders in Sabah. We will create long-term sustainability by providing mechanisms for advanced multi-disciplinary training at UMS by offering short courses and seminars to graduate students and professionals related on the subjects of sustainable land use, conservation, disease ecology, economics, and global health.

Phase one of this project will entail establishing the center at UMS and identifying local stakeholders who will be engaged in center activities. On May 14, 2013 EcoHealth Alliance and Sabah Wildlife Department convened a meeting of potential stakeholders in Kota Kinabalu (see table of potential stakeholders). In attendance were representatives from Sabah state government such as the Department of Veterinary Services, the Sabah Wildlife Department, and the Department of Health. Also in attendance were members of academia and local NGOs including the University of Malaysia, Sabah School of Business and Economics, HUTAN, WWF Malaysia, LEAP (Land Empowerment, Animals, People) and the Danau Girang Field Center. We are currently working with the Dean and several faculty members of the Business school to link the modeling team from EcoHealth Alliance with faculty to construct economic models based on a scenarios approach of disease emergence. We will also work with UMS and Sabah Wildlife Department to identify and regularly convene relevant stakeholders from Sabah who will participate in the meetings held at the CDH. We have also engaged the Malaysian Palm Oil Council and SEDIA (Sabah Economic and Development Investment Authority) to ensure that we include private sector and business interests that are driving land use change in Sabah. Phase I will also include data acquisition from available government and academic sources as well as the USAID PREDICT DEEP FOREST project. We have begun to compile a list of available data and will continue to identify data sources during the first few months of this program. Graduate students from the Business school will be identified to participate in model development.

Phase II will include the establishment of regular meetings at the CDH for stakeholders to synthesize project findings and generate public and policy outreach material. We expect that the center will grow over the 3-year timeline to include scientists and other experts from Sabah and the international community who wish to learn spatial analysis or economic modeling via short courses and student projects. The Center will be open to both male and female students and

community members from Sabah. We will engage graduate students from UMS and staff from SWD to train in the Center in order to develop local capacity and create long-term sustainability for the Center's activities.

Our proposed outreach will build on EHA's extensive experience producing policy-relevant analyses aimed at guidelines on best practice, as well as innovative tools that can be used in capacity-building programs and training. For this project, we will introduce innovative tools to the private sector in Malaysia which will include a risk assessment tool to audit industry practices with respect to the risk of negative health outcomes. These tools will give detailed instructions to private sector Environment, Health and Safety (EHS) Officers to ensure that the industry is aware of emerging infectious disease hazards in their facility or surrounding environment. It will then recommend specific mitigation and control strategies should the industry not already have specific measures in place. We will also aim to provide supplemental information to the International Finance Corporation's (IFC) guidelines on health impact assessments (HIA).

Included in the gender-sensitive health impacts toolkit, we will identify opportunities to promote women's leadership, communication propensity and community/familial participation in mitigating disease risks. We will produce printed and web-based materials and other educational outreach material on infectious disease risk in collaboration with the Malaysian Ministry of Health to be distributed to private partners, government agencies and other institutions. We will organize workshops for worker populations drawing on expertise from EHA, public entities (Department of Health) and private industries. The aim of these will be to improve understanding of and access to healthcare services and strengthen the skillset of the healthcare workforce. These workshops and interactions will provide iterative opportunities to refine and strengthen the toolkit throughout the life of the project, as well as to identify additional audiences that will benefit from the toolkit.

Data from the DFHC survey will provide private partners with information on relative risk of outbreaks and disease emergence, as well as cost of infection in men, women and children. Data from this survey could be used by private partners in collaboration with the Department of Health to inform the design of interventions to reduce the transmission of zoonoses by 1) providing standard estimates of rates of human contact with different animal species, 2) identifying populations and sub-groups with particularly high rates of contact, 3) determining which human activities are associated with particularly high rates of contact and 4) specifying other environmental and social issues that place people at increased risk of disease transmission.

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## **Section B - Proposed Outcomes/Results**

The overall project outcome will be the development of an evidence-based model that values emerging infectious disease avoidance as a function of land use, and application of this model in real-world land use decision contexts to reduce risk of emerging infectious diseases and to mitigate climate change toward climate-resistant low emissions development. To achieve this, EcoHealth Alliance and its partners will generate two Intermediate Results and five associated Sub-Intermediate Results:

### **Intermediate results**

*Intermediate Result 1:* Availability of field-trialed quantitative models capturing gender sensitive EID-related health savings as a function of land use. This will result will be generated through two sub-intermediate results:

*Sub-IR 1.2:* Data gathering required to run the quantitative model

*Sub-IR 1.1:* Development of quantitative algorithm assessing EID spillover likelihood and cost as function of land use.

*Intermediate Result 2:* Improved multi-channel availability of EID-focused quantitative resources amongst civil society advocates and government policy makers. This will result will be generated through three sub-intermediate results:

*Sub-IR: 2.1.* Establishment of a center of excellence (the Center for Development and Health (CDH)) for additional research, analysis, and cross-disciplinary partnerships

*Sub-IR 2.2:* Development of a gender sensitive tool kit for communicating the health impacts of differing land use options

*Sub-IR 2.3: Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates.*

The full objectives and sub-objectives, activities, measurable outcome or indicator, time frame, and responsible party are listed on the “Monitoring and Evaluation” table in Annex A.

At the end of the project period, we will have produced four main deliverables that satisfy the proposed IRs and sub-IRs (see Annex A). They are: 1) quantitative models of land use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications (described in Section A of Narrative above, sub-IR 1.1 and sub-IR 1.2), 2) the Center for Development and Health at UMS to serve as a permanent Center of Excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land use change, disease emergence, and subject area gender-related issues (sub-IR 2.1), 3) gender-sensitive health impacts toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits (sub-IR 2.2), and 4) scientific translation communications toolkits that translate research and modeling results to be useful for policy makers, private companies and government organizations, and civil society stakeholders (sub-IR 2.3).

The final products of the modeling components have been previously described in Section A of the Narrative.

The creation of the Center for Development and Health (CDH) at UMS will sustain the Project’s impacts beyond the project period. The CDH will provide an environment for experts to continually update data, refine models, and sustainably understand the impact of land use change on economic parameters. The Center operationalizes concepts developed by EcoHealth Alliance and its partners under the One Health approach, bringing together a multidisciplinary team to discover new information about the intersection of human and animal health, disease risk assessment, and ecology. By creating the Center within the Business School at UMS, we promote collaboration and innovation across disciplines and the formation of effective non-traditional partnerships.

The team at EcoHealth Alliance will work with the Center for Development and Health to develop communications toolkits and strategies for disseminating scientific findings to policymakers and key partners in industry, government and the public. The aim of these strategies is to translate the our scientific analyses into actionable policies and practices for decision makers so that they can more formally integrate infectious disease and economic considerations into land use change planning and decision-making. One example of a near-term opportunity that our team will take if this proposal is successful, is to provide input to the Sabah Economic Development and Investment Authority which has developed a blueprint for development called the Sabah Development Corridor (SDC) – coordinated multi-sectoral development roadmap through 2025. SEDIA has made a commitment to responsible development, and has called for public input into the SDC. We would have an opportunity during the first year of this program, to provide input to SEDIA for the SDC regarding considerations of the cost of health impacts of land alteration. As we develop our models, we would continue to provide information to SEDIA regarding the costs associated with potential disease outbreaks.

In addition to working with Sabah government, we will develop outreach materials for the public, focusing on gender-specific health and economic impacts of land conversion relevant to local communities where land use change activities are planned or are currently underway. Our local partners such as SWD, UMS, LEAP (Land Empowerment, Animals, People), and HUTAN have a long history of working with local communities on conservation and social welfare issues, and we will leverage their expertise and relationships with local communities to implement educational outreach strategies. This outreach strategy will significantly enhance the scientific knowledge base around ecosystem services valuation of benefits derived from intact ecosystems, especially with regard to disease risk assessment. Thus, the generation of knowledge in this area will allow for communication of evidence-based findings and actions. The policy and public outreach materials generated through the Center for Development and Health will be generalizable and adaptable to Malaysia-wide or regional policy considerations related to land use decisions.

The gender sensitive health impacts toolkit will include practical “how-to” methodologies, tools, and guides designed to facilitate the integration of gender issues into health policies and programs. It is designed for government policymakers, private industry, program managers, and community health workers to explore different strategies, media, and messages about gender and to communicate the EID-related human health impacts and economic implications of potential land use decisions.

The toolkit will provide a roadmap for translating the results of the quantitative model into actionable practices and policies. It will be designed to communicate disease risk assessment results effectively, with specific attention to unique considerations of women and their disease exposure risks. It will enable such diverse groups as civil society advocates, private industry, and government policymakers, to operationalize gender sensitive policy communication strategies. Finally, because mainstreaming gender falls under the third Millennium Goal of gender equality, and aligns with USAID goals and policies, the toolkit will highlight the importance of incorporating women into leadership and planning capacities related to land use change decisions.

The scientific translation communications toolkits for scientific findings will disseminate and translate scientific findings into actionable policies and practices for decision makers to more formally integrate infectious disease and economic considerations into land use change planning and decision-making. This outreach strategy will tie into the generation of the findings from the models, which will drastically enhance the scientific knowledge base around ecosystem services valuation of benefits derived from intact ecosystems, especially with regard to disease risk assessment. Thus, the generation of knowledge in this area will allow for communication of evidence-based findings and actions. Toolkits and/or outreach materials will be tailored to the various stakeholder audiences described above in Section A of the Narrative. Tools will also be generalized and adapted for integration in landscape land use decisions regionally and globally.

## **Section C - Management Plan and Key Personnel**

### **Management Plan**

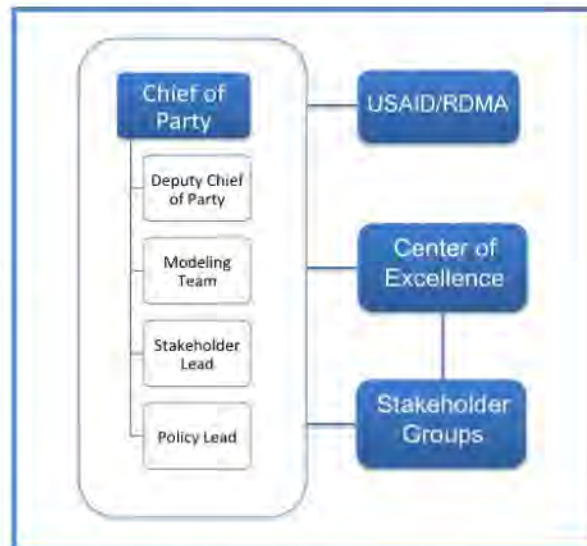
EcoHealth Alliance, by charter, is structured as an alliance of partner organizations and agencies collaborating to achieve multi-disciplinary and mutually agreed upon outcome. As such, EHA’s



standard operational approaches are particularly well suited for managing this program. To significantly reduce both start-up time and project costs, EHA will assign current key staff and utilize existing partnerships in the region to manage and implement the project. During the course of the project, additional local staff and partners will be identified and added with the goal of a local, sustainable center of excellence being functional by the end of the project.

Project oversight and administrative management will be provided by the EHA home office in New York and implementation of Malaysia-based activities will be managed by the Deputy Chief of Party and their team based in Kuala Lumpur and Kota Kinabalu, Malaysia. As the project will be based on a Cooperative Agreement, we envision that USAID/RDMA would also serve in providing advice and guidance to the project oversight and management team.

To facilitate this exchange of ideas, we are proposing a minimum of 1) 6-monthly in-person meetings between key project personnel and partners and USAID/RDMA staff to be held either in Bangkok or in Kota Kinabalu, 2) quarterly written reports to USAID/RDMA, and 3) monthly conference calls. These communication vehicles will also serve to augment monitoring and evaluation.



**Proposed Key Personnel** and their project duties are listed below. Resumes and references are provided in Annex B.

### **Chief of Party (CoP):**

*Project Responsibilities (Job Description):* The CoP will provide overall management and coordination of program vision, direction and functional successes; and is responsible for the administration and integration of the entire program. To guarantee fiscal responsibility and responsiveness to the needs of the program, the CoP will review and approve budgets to ensure they are in line with the work proposed, consistent with applicable rules and guidelines and committing sufficient effort for project participants. The CoP will conduct periodic reviews with the Administrative Coordinator to assess ongoing budgetary needs and will call and lead meetings with the Senior Management Team (CoP, Deputy CoP, Stakeholder and Partners Lead, Policy Lead, and Administrative Coordinator) to assess the program's productivity and accomplishments with respect to its goals. He/she will request and conduct site visits as needed. The CoP will also directly oversee the Modeling Team and be responsible for ensuring modeling activities and products are integrated with other project components.

*Proposed Individual:* Dr. Peter Daszak is President of EcoHealth Alliance, a US-based organization that conducts research and outreach programs on global health, conservation and international development. Dr. Daszak's research has been instrumental in modeling, analyzing and predicting the origin and economic impact of emerging diseases. His achievements include producing the first ever global emerging disease 'hotspots' map, the design and implementation



of the DEEP FOREST Project, identification of the wildlife reservoir of SARS, identifying the causes of Nipah and Hendra virus emergence, and coining the term 'pathogen pollution'. He has 20 years' experience managing international research and outreach projects, including directing the Consortium for Conservation Medicine for 8 years, establishing EHA's formal partnership with the Malaysian Govt. 15 years ago (HERG), and launching the One Health Alliance of South Asia in 2008. Currently, Dr. Daszak leads the modeling team for the USAID EPT PREDICT program.

**Deputy Chief of Party (DCoP):**

*Project Responsibilities (Job Description):* The day-to-day management of the project in Malaysia will be the overall responsibility of the DCoP, performed with regular communications and assistance of the other key personnel, the administrative staff from the home office, the Center of Excellence in Sabah and other key partners. The DCoP will serve as the most frequent Point of Contact for USAID RDMA for programmatic matters, the Center of Excellence and key partners in Malaysia. The DCoP will divide his/her time between Sabah, peninsula Malaysia and Bangkok as needed to interact with partners and supervise activities.

*Proposed Individual:* (b)(6) is currently the Malaysian (b)(6) at EcoHealth Alliance. His responsibilities include setting up and running the Study of Zoonotic Infections among Persons Exposed to Wild Animals, a collaborative research project with Global Viral and the Malaysian Government. In Malaysia, (b)(6) has worked closely with partners from the Ministry of Health, the Department of Wildlife and National Parks, and the Department of Veterinary Services, over the last 8 years to develop personnel and laboratory capacity and establish sustainable disease surveillance systems for wildlife and people with high exposure to wildlife. In the last two years (b)(6) has established the EHA Deep Forest Project in Sabah, a study of the effects of land use change on viral diversity. In 2010, (b)(6) became the PREDICT Malaysia (b)(6) for USAID's Emerging Pandemic Threats program. The aim of this research is to integrate wildlife disease surveillance into the public health infrastructure in order to create an early warning system for potential zoonotic disease spillover into domestic animals and humans. In Malaysia, (b)(6) is working closely with partners from the Ministry of Health, the Department of Wildlife and National Parks, the Department of Veterinary Services, Sabah Wildlife Department and local universities.

**Stakeholder Coordination Lead (SCL):**

*Project Responsibilities (Job Description):* The SCL will work with Malaysian National and State government authorities and private sector parties to identify, engage and maintain working relationships with relevant stakeholders throughout the life of the project. The SCL will ensure high level integration of project activities and products with stakeholder and partner needs and priorities, help develop and implement workshops with the DCOP and the Center for Development and Health, provide consistency in approaches across the project, and provide the oversight for sustainable transition of relevant activities to partners by the end of the project.

*Proposed Individual:* (b)(6) of Conservation Medicine at EcoHealth Alliance where he has managed projects on the emergence of Nipah and Ebola virus, SARS, MERS, and other zoonotic diseases within Asia and Africa. (b)(6) has directed US government-funded EHA programs in Malaysia since 2003 including a study of the ecology of Nipah virus, and is currently the (b)(6) for PREDICT. He has brought together diverse stakeholders, including government agencies, universities and NGO's



across multiple countries in South Asia to lead the One Health Association of South Asia, and currently directs two other multi-disciplinary and multi-stakeholder groups, EcoHealth Net and the Consortium for Conservation Medicine.

**Policy Leader (PL):**

*Project Responsibilities (Job Description):* The PL will be responsible for identifying opportunities and strategies for program outcomes to serve as guidance for policy and best practices among government and non-governmental stakeholders in Sabah, Malaysia, and regionally as appropriate. The SL will meet with high-level government agency representatives to share finding and discuss opportunities for policy engagement. The SL will also share findings and policy opportunities with international and inter-governmental organizations and agencies such as the World Bank, WHO, FAO, OIE, CGIAR, and bi-lateral aid agencies

*Proposed Individual:* (b)(6)  
at EcoHealth Alliance. (b)(6)

(b)(6) serves on the World Health Organization's (WHO) International Health Regulations Roster of Experts focused on the human-animal interface and wildlife health. He also serves as the president of the World Animal Health Organization (OIE) Working Group on Wildlife Diseases and also chairs the International Union for the Conservation of Nature (IUCN) Wildlife Health Specialist Group, a network of wildlife and health experts around the world. Currently, (b)(6) for the USAID Emerging Pandemic Threats PREDICT program.

**Proposed Key Technical Personnel**

**Center of Excellence Director:** (b)(6)  
(b)(6)

**Center of Excellence Associate:** (b)(6)  
(b)(6)

**Sabah Wildlife Department Chief Liaison to IDEEAL:** (b)(6)  
(b)(6)

**Economic Modeler:** (b)(6)

(b)(6)

**Social Science Lead:** (b)(6)

(b)(6)

**DEEP FOREST Liaison:** (b)(6)

(b)(6)

**Senior Modeler:** (b)(6)

(b)(6)

**Program Coordinator for Health and Policy:** (b)(6)

(b)(6)

## **ANNEX A: Implementation Work Plan, Monitoring and Evaluation plan and Time Line**

We will use the proposed (and negotiated) monitoring and evaluation (M&E) plan to provide the structure for project management oversight and determining adherence to timelines for activities and deliverables. In designing the M&E plan for this project, EHA and partners based in Sabah, Malaysia have combined relevant USAID agency indicators with our experience working on disease and economic modeling projects, as well as long-term stakeholder engagement in the state, to develop project indicators that quantitatively (employing numerical indicators, as well as binary classifications where appropriate) demonstrate how the proposed work plan will contribute to the two intermediate results, five sub-intermediate results, and the overall project outcome. The proposed performance-based M&E plan aims to be consistent with the evaluation requirement features outlined in the USAID Evaluation Policy. EHA will deliver a draft Performance Management Plan within sixty days following the award, during which it will work with USAID/RDMA to further refine the proposed M&E plan. The M&E plan will be revised as necessary with RDMA through the annual work plan development to ensure consistency with any changes to standard indicators.

EcoHealth Alliance will oversee M&E activities for the project. Monitoring systems will be established that enable regular tracking of indicators and will include compilation of information from quarterly reports of project activities and employment of project management systems to pair activities and indicators with timelines. Each activity will also be assigned a lead point of contact responsible for tracking the progress of the activity and helping to proactively identify and respond to any situations that could cause potential delays in meeting planned time frames. The project's Primary Investigators will also conduct monthly meetings with project personnel for updates on the progress of each activity. In addition, EcoHealth Alliance will submit quarterly reports to RDMA, and will provide verbal updates at semi-annual meetings at RDMA headquarters or at facility site visits. These opportunities will assist in providing additional assessment of progress towards meeting intermediary and overall objectives. All evaluation data generated from the project will be provided to USAID monitoring and evaluation systems as directed by the Agreement Officer's Technical Representative (AOTR).



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y 1 Q 1	Y 1 Q 2	Y 1 Q 3	Y 1 Q 4	Y 2 Q 1	Y 2 Q 2	Y 2 Q 3	Y 2 Q 4	Y 3 Q 1	Y 3 Q 2	Y 3 Q 3	Y 3 Q 4
Structure project and establish management capacity	0.1 Secure core management staff	All Management staff hired and assigned to duty	EHA	X											
	0.2 Identify and secure core administrative staff	All Administrative staff hired and assigned to duty	EHA	X											
	0.3 Finalize and establish approved monitoring and evaluation plan with RDMA	Monitoring and evaluation plan approved and finalized	EHA	X											
	0.4 Set up of financial management systems	Accounts created with mechanisms for tracking expenditures		X											
	0.5 Quarterly	On-time submission of	EHA	X	X	X	X	X	X	X	X	X	X	X	X

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y 1	Y 1	Y 1	Y 1	Y 2	Y 2	Y 2	Y 2	Y 3	Y 3	Y 3	Y 3
				Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
	activities														
	0.6 Semi-annual review of program activities and progress at RDMA or during site visits to Sabah	Completion at RDMA headquarters or site visit	RDMA and EHA		X		X		X		X		X		X
Sub-IR 1.2: Required data gathered to run the quantitative model	1.2.1 Meet with relevant partners to identify data availability	Meeting held; list of available data assembled	EHA	X	X	X	X								
	1.2.2 Obtain available temporal, geospatial data of land use/land-cover	a. Temporal, geospatial land-use/land-cover data obtained	EHA	X	X	X	X								
		b. Disease data obtained	EHA	X	X	X	X								

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	and disease data														
	1.2.3 Obtain available demographic and land planning data from relevant government sources and partners	Available demographic and land planning data obtained	EHA			X	X								
	1.2.4 Obtain available economic parameter/indicator data	Available economic parameter/indicator data obtained	EHA	X	X	X	X								
	1.2.5 Identify and obtain data to correct for reporting bias	Data to correct for reporting bias identified and obtained	EHA	X	X	X	X								



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y 1	Y 1	Y 1	Y 1	Y 2	Y 2	Y 2	Y 2	Y 3	Y 3	Y 3	Y 3
				Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
	1.2.6 Obtain new data, including DEEP FOREST human contact and disease data	New data obtained	EHA	X	X	X	X								
	1.2.7 Ensure gender-specified data is included in activities 1.2.2-1.2.6	Gender-specified data is included	EHA	X	X	X	X								
<b>Sub-IR 1.1: Development of quantitative algorithm assessing EID spillover likelihood and</b>	1.1.1 Estimate the likelihood of EID outbreaks	Bayesian, count-data models for different temporal and spatial scales developed	EHA		X	X	X	X							
	1.1.2 Determine the value of avoided damages from	Value of avoided damages determined	EHA		X	X	X	X							

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
cost as function of land use	past EID events														
	1.1.3 Create a model to predict expected damages of future disease events	Model to predict damages created	EHA			X	X	X							
	1.1.4.a. Determine rates of land-use/land cover change under 3 different scenarios— Business as Usual (BAU), Increased land-use change, halted land-use change	Three scenario models created	EHA			X	X	X	X						



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	1.1.4.b. Use expected damages function to predict damages under deforestation scenarios	Expected damages under deforestation scenarios predicted	EHA			X	X	X	X	X					
	1.1.5 Investigate incorporation of avoided damages into total ecosystem services model	Integration with total ecosystem services model explored	EHA						X	X	X	X	X		
	1.1.6 Produce actionable model outputs and analyses for application in promoting	Models produced and scientific translation communications toolkit produced (see 2.3.2)	EHA					X	X	X	X	X	X		

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y1 Q1	Y1 Q2	Y1 Q3	Y1 Q4	Y2 Q1	Y2 Q2	Y2 Q3	Y2 Q4	Y3 Q1	Y3 Q2	Y3 Q3	Y3 Q4
	reduced-impact land utilization														
<b>Sub-IR 2.1: Establishment of a center of excellence, for additional research, analysis, and crossdisciplinary partnerships</b>	2.1.1 Establish Center for Development and Health (CDH) at the School of Economics and Business at University Malaysia, Sabah	a. Concept developed and agreed upon	UMS and EHA	X											
		b. CDH established	UMS and EHA	X	X										
	2.1.2 Select local or regional graduate students for involvement	Graduated students selected	UMS/CDH			X		X				X			
	2.1.3 Develop and oversee	Completed student projects submitted to the	UMS/CDH and				X		X		X		X		X

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	student projects to promote use of spatial analysis, health outcome and economic models	CDH / UMS faculty	EHA												
	2.1.4 Develop short-courses around LUCDEP themes	Short-course developed	UMS/CDH and EHA							X	X	X	X	X	X
	2.1.5 Identify stakeholders for participation in the Center with help from UMS and SWD	Stakeholders identified	UMS/CDH, SWD and EHA	X	X	X	X	X	X	X	X	X	X	X	X
	2.1.6 Establish regular	a. Meetings held	UMS/CDH												

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y 1	Y 1	Y 1	Y 1	Y 2	Y 2	Y 2	Y 2	Y 3	Y 3	Y 3	Y 3
				Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
	meetings, including quarterly roundtables at the CDH for stakeholders for public dissemination of materials and information	b. Meeting schedule established	UMS/CDH	X	X	X	X	X	X	X	X	X	X	X	X
<b>Sub-IR 2.2: Development of a gender sensitive tool kit for communicating the health impacts of</b>	2.2.1 Conduct survey of differential gendered disease risk exposure pathways to inform toolkit development and dissemination	Survey(s) conducted	UMS/CDH and EHA		X	X	X								



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
differing land use options	strategies														
	2.2.2 Integrate findings from quantitative models and additional data		UMS/CD H and EHA						X	X	X	X	X		
	2.2.3 Generate draft toolkit	Draft toolkit developed	UMS/CD H and EHA							X	X				
	2.2.4 Conduct external review of toolkit by stakeholder representatives, including focus group involvement to generate feedback on	External review conducted and feedback compiled into broad themes and actionable modifications	UMS/CD H and EHA								X				



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	gender sensitivity and utility to stakeholders														
	2.2.5 Finalize toolkit	Incorporate feedback into toolkit to generate final version	UMS/CD H and EHA								X				
	2.2.6 Develop an outreach plan to share gender-sensitive health impacts toolkit with the public as well as with government agencies, civil society, and the private sector (link to sub-IR	Outreach plan developed	UMS/CD H and EHA							X	X				

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y 1 Q 1	Y 1 Q 2	Y 1 Q 3	Y 1 Q 4	Y 2 Q 1	Y 2 Q 2	Y 2 Q 3	Y 2 Q 4	Y 3 Q 1	Y 3 Q 2	Y 3 Q 3	Y 3 Q 4
	2.3)														
<b>Sub-IR 2.3: Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates</b>	2.3.1 Establish regular meetings, including quarterly roundtables at the CDH for stakeholders engagement in design and production of outreach materials	a. Meetings held	UMS/CDH	X	X	X	X	X	X	X	X	X	X	X	X
		b. Number of unique stakeholder organizations	UMS/CDH	X	X	X	X	X	X	X	X	X	X	X	X
		c. Number of individual sectors	UMS/CDH	X	X	X	X	X	X	X	X	X	X	X	X
	2.3.2 Develop printed and web-based materials for	Scientific translation communications toolkit produced	EHA, UMS/CDH, SWD							X	X				

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	dissemination to community leaders, industry leaders, and government partners														
	2.3.3 Develop dissemination strategy for outreach materials including scientific translation communications toolkit in consultation with stakeholders	Dissemination strategy developed	EHA, UMS/CDH, SWD							X	X				

IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	2.3.4 Disseminate outreach materials and toolkits to community leaders	a. Outreach materials and toolkits disseminated to communities	EHA, UMS/CD H, SWD									X	X	X	X
		b. Town hall meeting public fora held	EHA, UMS/CD H, SWD									X	X	X	X
	2.3.5 Develop website and social media platforms	Platforms developed; usage monitored by visits/followers	UMS/CD H and EHA			X	X	X	X	X	X	X	X	X	X
	2.3.6 Design and deliver short-term training programs (in person and/or online) to address immediate needs of	Per-session person counts (in-person counts, or IP address counts for online training)	UMS/CD H and EHA							X	X	X	X	X	X



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	existing professionals to increase their knowledge and capacity in the area of land use change														
	2.3.7 Conduct workshops for SWD and other relevant local govt staff in use of toolkits and other outreach materials	Number of workshop attendees	UMS/CD H and EHA							X	X	X	X	X	X
	2.3.8 Evaluate stakeholder awareness of issues of land use change, risk	Baseline and follow-up surveys conducted	UMS/CD H and EHA	X										X	



IDEEAL Work Plan and Time Line				Time line											
Objective / Result	Activity	Measurable Outcome or Indicator	Responsible Party	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
				1	1	1	1	2	2	2	2	3	3	3	3
				Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
				1	2	3	4	1	2	3	4	1	2	3	4
	of disease emergence, and gender implications														

**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
<b>Structure project and establish management capacity</b>		0.1 Secure core management staff	All Management staff hired and assigned to duty	Y1 Q1	EHA
		0.2 Identify and secure core administrative staff	All Administrative staff hired and assigned to duty	Y1 Q1	EHA
		0.3 Finalize and establish approved monitoring and evaluation plan with RDMA	Monitoring and evaluation plan approved and finalized	60 days after award	EHA
		0.4 Set up of financial management systems	Accounts created with mechanisms for tracking expenditures	Y1 Q1	
		0.5 Quarterly reporting of overall program activities	On-time submission of reports	Quarterly	EHA
		0.6 Semi-annual review of program activities and progress at RDMA or during site visits to Sabah	Completion at RDMA headquarters or site visit	Semi-annually	RDMA and EHA
<b>Objective 1: Creation of field-trialed</b>	<b>Sub-IR 1.2: Required data gathered</b>	1.2.1 Meet with relevant partners to identify data availability	Meeting held; list of available data assembled	Y1	EHA

**IDEAL Monitoring and Evaluation Plan**

<b>Objective/Result</b>	<b>Sub-IR</b>	<b>Activity</b>	<b>Measurable Outcome or Indicator</b>	<b>Time frame</b>	<b>Responsible Party</b>
<b>quantitative models capturing gender sensitive EID-related health savings as a function of land use</b>	<b>to run the quantitative model</b>	1.2.2 Obtain available temporal, geospatial data of land use/land-cover and disease data	a. Temporal, geospatial land-use/land-cover data obtained	Y1	EHA
			b. Disease data obtained	Y1	EHA
		1.2.3 Obtain available demographic and land planning data from relevant government sources and partners	Available demographic and land planning data obtained	Y1 Q3 - Q4	EHA
		1.2.4 Obtain available economic parameter/indicator data	Available economic parameter/indicator data obtained	Y1	EHA
		1.2.5 Identify and obtain data to correct for reporting bias	Data to correct for reporting bias identified and obtained	Y1	EHA
		1.2.6 Obtain new data, including DEEP FOREST human contact and disease data	New data obtained	Y1	EHA
		1.2.7 Ensure gender-specified data is included in activities 1.2.2-1.2.6	Gender-specified data is included	Y1	EHA



**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
	<b>Sub-IR 1.1: Development of quantitative algorithm assessing EID spillover likelihood and cost as function of land use</b>	1.1.1 Estimate the likelihood of EID outbreaks	Bayesian, count-data models for different temporal and spatial scales developed	Y1 Q2 - Y2 Q1	EHA
		1.1.2 Determine the value of avoided damages from past EID events	Value of avoided damages determined	Y1 Q2 - Y2 Q1	EHA
		1.1.3 Create a model to predict expected damages of future disease events	Model to predict damages created	Y1 Q3 - Y2 Q1	EHA
		1.1.4.a. Determine rates of land-use/land cover change under 3 different scenarios— Business as Usual (BAU), Increased land-use change, halted land-use change	Three scenario models created	Y1 Q3 - Y2 Q2	EHA
		1.1.4.b. Use expected damages function to predict damages under deforestation scenarios	Expected damages under deforestation scenarios predicted	Y1 Q3 - Y2 Q3	EHA
		1.1.5 Investigate incorporation of avoided damages into total ecosystem services model	Integration with total ecosystem services model explored	Y2 Q2 - Y3 Q2	EHA

**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
		1.1.6 Produce actionable model outputs and analyses for application in promoting reduced-impact land utilization	Models produced and scientific translation communications toolkit produced (see 2.3.2)	Y2 Q1 - Y3 Q2	EHA
<b>Objective 2: Improved multi-channel availability of EID-focused quantitative resources amongst civil society advocates and government policy makers</b>	<b>Sub-IR 2.1: Establishment of a center of excellence, for additional research, analysis, and crossdisciplinary partnerships</b>	2.1.1 Establish Center for Development and Health (CDH) at the School of Economics and Business at University Malaysia, Sabah	a. Concept developed and agreed upon	Y1 Q1	UMS and EHA
			b. CDH established	Y1 Q1 - Q2	UMS and EHA
		2.1.2 Select local or regional graduate students for involvement	Graduated students selected	Y1 Q 3	UMS/CDH
		2.1.3 Develop and oversee student projects to promote use of spatial analysis, health outcome and economic models	Completed student projects submitted to the CDH / UMS faculty	Y1 Q3 - Y3	UMS/CDH and EHA
		2.1.4 Develop short-courses around LUCDEP themes	Short-course developed	Y2 Q3 - Y3	UMS/CDH and EHA
		2.1.5 Identify stakeholders for participation in the Center with help from UMS and SWD	Stakeholders identified	Ongoing	UMS/CDH, SWD and EHA



**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
		2.1.6 Establish regular meetings, including quarterly roundtables at the CDH for stakeholders for public dissemination of materials and information	a. Meetings held		UMS/CDH
			b. Meeting schedule established	Quarterly	UMS/CDH
	<b>Sub-IR 2.2: Development of a gender sensitive tool kit for communicating the health impacts of differing land use options</b>	2.2.1 Conduct survey of differential gendered disease risk exposure pathways to inform toolkit development and dissemination strategies	Survey(s) conducted	Y1 Q2 - Q4	UMS/CDH and EHA
		2.2.2 Integrate findings from quantitative models and additional data	see next step	Y2 Q2 - Y3 Q2	UMS/CDH and EHA
		2.2.3 Generate draft toolkit	Draft toolkit developed	Y2 Q3 - Q4	UMS/CDH and EHA
		2.2.4 Conduct external review of toolkit by stakeholder representatives, including focus group involvement to generate feedback on gender sensitivity	External review conducted and feedback compiled into broad themes and actionable modifications	Y2 Q4	UMS/CDH and EHA

**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
		and utility to stakeholders			
		2.2.5 Finalize toolkit	Incorporate feedback into toolkit to generate final version	Y2 Q4	UMS/CDH and EHA
		2.2.6 Develop an outreach plan to share gender-sensitive health impacts toolkit with the public as well as with government agencies, civil society, and the private sector (link to sub-IR 2.3)	Outreach plan developed	Y2 Q3 - Q4	UMS/CDH and EHA
	<b>Sub-IR 2.3: Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates</b>	2.3.1 Establish regular meetings, including quarterly roundtables at the CDH for stakeholders engagement in design and production of outreach materials	a. Meetings held	Quarterly	UMS/CDH
			b. Number of unique stakeholder organizations	Quarterly	UMS/CDH
			c. Number of individual sectors	Quarterly	UMS/CDH
		2.3.2 Develop printed and web-based materials for dissemination to community leaders, industry leaders, and	Scientific translation communications toolkit produced	Y2 Q3 - Q4	EHA, UMS/CDH, SWD

**IDEAL Monitoring and Evaluation Plan**

Objective/Result	Sub-IR	Activity	Measurable Outcome or Indicator	Time frame	Responsible Party
		government partners			
		2.3.3 Develop dissemination strategy for outreach materials including scientific translation communications toolkit in consultation with stakeholders	Dissemination strategy developed	Y2 Q3 - Q4	EHA, UMS/CDH, SWD
		2.3.4 Disseminate outreach materials and toolkits to community leaders	a. Outreach materials and toolkits disseminated to communities	Y3 Q1 - Q4	EHA, UMS/CDH, SWD
			b. Town hall meeting public fora held	Y3 Q1 - Q4	EHA, UMS/CDH, SWD
		2.3.5 Develop website and social media platforms	Platforms developed; usage monitored by visits/followers	Y1 Q3	UMS/CDH and EHA
		2.3.6 Design and deliver short-term training programs (in person and/or online) to address immediate needs of existing professionals to increase their knowledge	Per-session person counts (in-person counts, or IP address counts for online training)	Y2 Q3 - Y3 Q4	UMS/CDH and EHA



**IDEAL Monitoring and Evaluation Plan**

<b>Objective/Result</b>	<b>Sub-IR</b>	<b>Activity</b>	<b>Measurable Outcome or Indicator</b>	<b>Time frame</b>	<b>Responsible Party</b>
		and capacity in the area of land use change			
		2.3.7 Conduct workshops for SWD and other relevant local govt staff in use of toolkits and other outreach materials	Number of workshop attendees	Y2 Q3 - Y3 Q4	UMS/CDH and EHA
		2.3.8 Evaluate stakeholder awareness of issues of land use change, risk of disease emergence, and gender implications	Baseline and follow-up surveys conducted	Y1 Q1 and Y3 Q3	UMS/CDH and EHA

## **ANNEX B: PERSONNEL**



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biodiversity, evolution, behavior, and infectious diseases. Current projects include the roles

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Page 202 of 253

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Page 203 of 253

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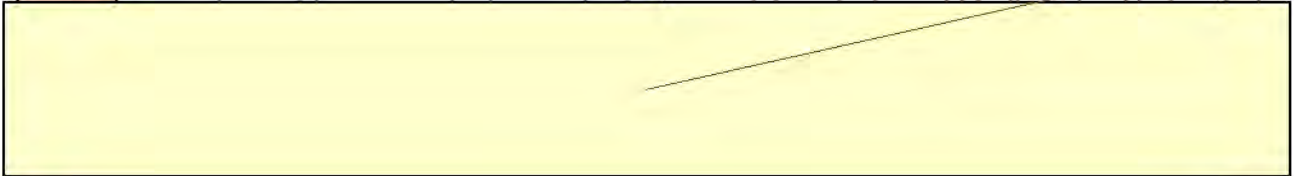
EcoHealth Alliance, 460 W. 34<sup>th</sup> St. New York, NY 10001

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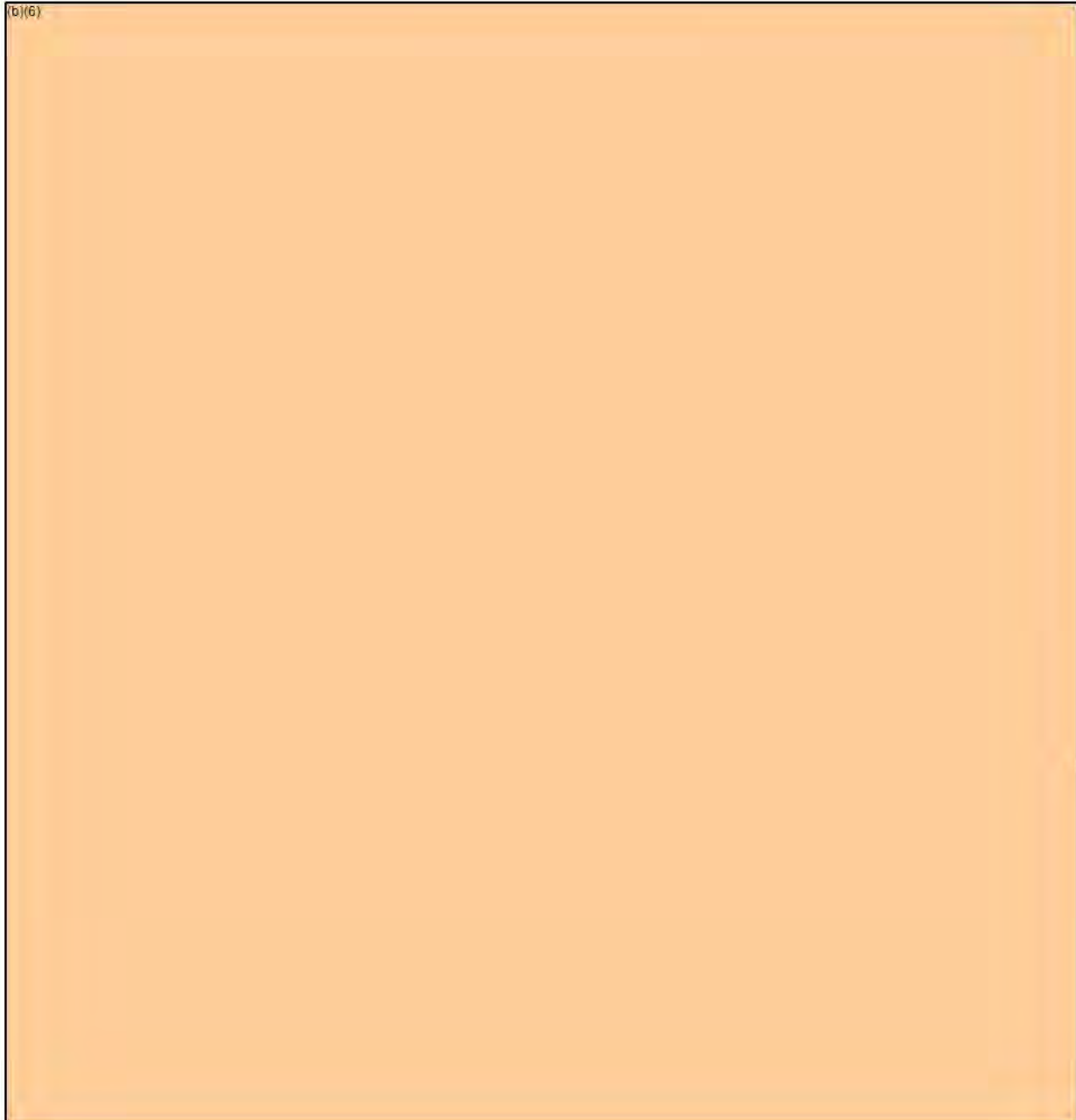
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May 21, 2013

To Whom it May Concern:

I, Peter Daszak, hereby confirm my availability to serve as Chief of Party (CoP) within the same day following awarding of the proposed project for the USAID/RDMA Program entitled "Land Use Change and Disease Emergence: Promoting Valuation of Environmental Services in Furtherance of Public Health and Sustainable Landscapes". I intend to serve in this role for the entirety of the proposed project (three years following the start of the project). I agree to the compensation levels which correspond to the levels set forth in the cost application.

Sincerely,

(b)(6)

**Peter Daszak, PhD**

*President*

EcoHealth Alliance

460 West 34th Street – 17th floor

New York, NY 10001

1.212.380.4473 (direct)

1.212.380.4465 (fax)

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[www.ecohealthalliance.org](http://www.ecohealthalliance.org)

*EcoHealth Alliance integrates innovative science-based solutions and partnerships that increase capacity to achieve two interrelated goals: protecting global health by preventing the outbreak of emerging diseases and safeguarding ecosystems by promoting conservation.*





## EcoHealth Alliance

May 21, 2013

(b)(6)

To Whom it May Concern:

I, (b)(6), hereby confirm my availability to serve a (b)(6) within the same day following awarding of the proposed project for the USAID/RDMA Program entitled "Land Use Change and Disease Emergence: Promoting Valuation of Environmental Services in Furtherance of Public Health and Sustainable Landscapes". I intend to serve in this role for the entirety of the proposed project (three years following the start of the project). I agree to the compensation levels which correspond to the levels set forth in the cost application.

Sincerely,

(b)(6)

– Malaysia

EcoHealth Alliance

(b)(6)

(b)(6), Kuala Lumpur, Malaysia.

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May 21, 2013

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I, (b)(6) hereby confirm my availability to serve as (b)(6) within the same day following awarding of the proposed project for the USAID/RDMA Program entitled "Land Use Change and Disease Emergence: Promoting Valuation of Environmental Services in Furtherance of Public Health and Sustainable Landscapes". I intend to serve in this role for the entirety of the proposed project (three years following the start of the project). I agree to the compensation levels which correspond to the levels set forth in the cost application.

Sincerely,

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EcoHealth Alliance 460 West 34th Street – 17th floor

New York, NY 10001

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Sincerely,

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# UNIVERSITI MALAYSIA SABAH

Sekolah Perniagaan & Ekonomi  
School of Business & Economics



CERTIFIED TO ISO9001:2000 CERT. NO: AR 3088

Ruj. Kami :

Tarikh

Wednesday, 22 May 2013

Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

Dear Dr. Daszak,

I, and the School of Business and Economics will be pleased to collaborate exclusively on the application being led by EcoHealth Alliance to implement the USAID Land Use Change and Disease Emergence program should our team be chosen by USAID to conduct the work.

Should EcoHealth Alliance be successful in its application, I have agreed to participate in activities associated with this project including acting as a resource for information and insight based on my expertise, helping to establish a communication and information sharing platform, and assisting in identifying and locating relevant and available data sets, to help achieve the aims of this project. I will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings, and advise or participate in graduate student training activities.

This letter conveys my interest and commitment to making this initiative a success. We look forward to working with EcoHealth Alliance, the Sabah Wildlife Department, and USAID on this important project.

Sincerely,

(b)(6)

22 May, 2013  
Universiti Malaysia Sabah

## BERTEKAD CEMERLANG



# UNIVERSITI MALAYSIA SABAH

Sekolah Perniagaan & Ekonomi  
School of Business & Economics



CERTIFIED TO ISO9001:2000 CERT. NO: AR 1088

Ruj. Kami :

Tarikh : Wednesday, 22 May 2013

Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

Dear Dr. Daszak,

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This letter conveys my interest and commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

Sincerely,

(b)(6)

22 May, 2013  
Universiti Malaysia Sabah

## BERTEKAD CEMERLANG





**JABATAN HIDUPAN LIAR SABAH**

*(SABAH WILDLIFE DEPARTMENT)*

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Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

21<sup>st</sup> May 2013

Dear Dr. Daszak,

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This letter conveys my interest and commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

(b)(6)

**Sabah Wildlife Department  
MALAYSIA**

**DADAH MEMBAWA KESENGSARAAN  
PELIHARALAH KEHARMONIAN KELUARGA ANDA**

## References for Key Personnel

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## ANNEX C – Institutional Capabilities/Partnerships

Project oversight and administrative management will be provided by the EHA home office in New York and implementation of Malaysia based activities will be managed by the Deputy Chief of Party and his/her team based in Kuala Lumpur and Kota Kinabalu.

As the project will be based on a Cooperative Agreement, we envision that USAID/RDMA would also serve in providing advice and guidance to the project oversight and management team. Personnel Proposed and their project duties are listed below. Resumes and references are provided in Appendix B.

### Chief of Party: Dr. Peter Daszak (16.6% time)

The CoP will provide overall management and coordination of program vision, direction and functional successes; and is responsible for the administration and integration of the entire program. To guarantee fiscal responsibility and responsiveness to the needs of the program, the CoP will review and approve budgets to ensure they are in line with the work proposed, consistent with applicable rules and guidelines and committing sufficient effort for project participants. The CoP will conduct periodic reviews with the Administrative Coordinator to assess ongoing budgetary needs and will call and lead meetings with the Senior Management Team (CoP, Deputy CoP, Stakeholder and Partners Lead, Policy Lead, and Administrative Coordinator) to assess the program's productivity and accomplishments with respect to its goals. He will request and conduct site visits as needed. The CoP will also directly oversee the Modeling Team and be responsible for ensuring modeling activities and products are integrated with other project components.

Dr. Peter Daszak is President of EcoHealth Alliance, a US-based organization that conducts research and outreach programs on global health, conservation and international development. Dr. Daszak's research has been instrumental in modeling, analyzing and predicting the origin and economic impact of emerging diseases. His achievements include producing the first ever global emerging disease 'hotspots' map, the design and implementation of the DEEP FOREST Project, identification of the wildlife reservoir of SARS, identifying the causes of Nipah and Hendra virus emergence, and coining the term 'pathogen pollution'. He has 20 years' experience managing international research and outreach projects, including directing the Consortium for Conservation Medicine for 8 years, establishing EHA's formal partnership with the Malaysian Govt. in 2001 (HERG), and launching the One Health Alliance of South Asia in 2008. Currently, Dr. Daszak leads the modeling team for the USAID EPT PREDICT program.

(b)(6) (b)(6) (100% time or phased change-over from PREDICT duties as negotiated with USAID/RDMA)

(b)(6) (b)(6) The day-to-day management of the project in Malaysia will be the overall responsibility of the (b)(6) performed with regular communications and assistance of the other key personnel, the administrative staff from the home office, the Center of Excellence in Sabah and other key partners. The (b)(6) will serve as the most frequent Point of Contact for USAID/RDMA for programmatic matters, the Center of Excellence and key partners in Malaysia. The (b)(6) will divide his/her time between Sabah, peninsula Malaysia and Bangkok as needed to interact with partners and supervise activities.



(b)(6) is currently the Malaysian (b)(6) at EcoHealth Alliance. His responsibilities include setting up and running the Study of Zoonotic Infections among Persons Exposed to Wild Animals, a collaborative research project with Global Viral and the Malaysian Government. In Malaysia, (b)(6) has worked closely with partners from the Ministry of Health, the Department of Wildlife and National Parks, and the Department of Veterinary Services, over the last 8 years to develop personnel and laboratory capacity and establish sustainable disease surveillance systems for wildlife and people with high exposure to wildlife. In the last two years (b)(6) has established the EHA Deep Forest Project in Sabah, a study of the effects of land use change on viral diversity. In 2010, Tom became the PREDICT Malaysia (b)(6) for USAID's Emerging Pandemic Threats program. The aim of this research is to integrate wildlife disease surveillance into the public health infrastructure in order to create an early warning system for potential zoonotic disease spillover into domestic animals and humans. In Malaysia, (b)(6) is working closely with partners from the Ministry of Health, the Department of Wildlife and National Parks, the Department of Veterinary Services, Sabah Wildlife Department and local universities.

**Stakeholder Coordination Lead (SCL): (b)(6) (8.3%)**

*Project Responsibilities (Job Description):* The SCL will work with Malaysian National and State government authorities and private sector parties to identify, engage and maintain working relationships with relevant stakeholders throughout the life of the project. The SCL will ensure high level integration of project activities and products with stakeholder and partner needs and priorities, help develop and implement workshops with the DCOP and the Center for Development and Health, provide consistency in approaches across the project, and provide the oversight for sustainable transition of relevant activities to partners by the end of the project.

(b)(6) at EcoHealth Alliance where he has managed projects on the emergence of Nipah and Ebola virus, SARS, MERS, and other zoonotic diseases within Asia and Africa. (b)(6) has directed US government-funded EHA programs in Malaysia since 2003 including a study of the ecology of Nipah virus, and is currently the Asia Regional Coordinator for PREDICT. He has brought together diverse stakeholders, including government agencies, universities and NGO's across multiple countries in South Asia to lead the One Health Association of South Asia, and currently directs two other multi-disciplinary and multi-stakeholder groups, EcoHealth Net and the Consortium for Conservation Medicine.

**Policy Leader (PL): (b)(6) (8.3% time)**

The PL will be responsible for identifying opportunities and strategies for program outcomes to serve as guidance for policy and best practices among government and non-governmental stakeholders in Sabah, Malaysia, and regionally as appropriate. The SL will meet with high-level government agency representatives to share finding and discuss opportunities for policy engagement. The SL will also share findings and policy opportunities at a broader scale with international and inter-governmental organizations and agencies such as the World Bank, WHO, FAO, OIE, CGIAR, and bi-lateral aid agencies



(b)(6) at EcoHealth Alliance. He has over 25 years of international policy experience and has worked with the Sabah government since 1988. (b)(6) serves on the World Health Organization's (WHO) International Health Regulations Roster of Experts focused on the human-animal interface and wildlife health. He also serves as the president of the World Animal Health Organization (OIE) Working Group on Wildlife Diseases and also chairs the International Union for the Conservation of Nature (IUCN) Wildlife Health Specialist Group, a network of wildlife and health experts around the world. Currently, (b)(6) is the (b)(6) for the USAID Emerging Pandemic Threats PREDICT program.

### **Proposed Key Technical Personnel**

**Center of Excellence Director:** (b)(6) at the School of Business and Economics at the Universiti of Malaysia Sabah. (b)(6) will work with Senior Personnel and local partners to establish the Center for Development and Health at UMS. She will also facilitate workshops and mentor graduate students working under this project. (b)(6) at the School of Business and Economics at the Universiti of Malaysia Sabah.

**Center of Excellence Associate:** (b)(6) at the School of Business and Economics at UMS. He will work with (b)(6) to develop workshops and facilitate stakeholder meetings at the university. He will also mentor graduate students from the business school and staff from partner agencies that work under this project.

**Sabah Wildlife Department Chief Liaison to IDEAL:** (b)(6) is the (b)(6) of Sabah Wildlife Department, a position he has held since 2007. Prior to that, he was the (b)(6) from 1991. (b)(6) holds a BSc Degree (Zoology) from Southern Illinois University, USA, a post-graduate Diploma in Protected Landscape Management from Aberystwyth University, Wales, UK, and a PhD in Wildlife Management from Oxford University, United Kingdom. He also holds a professional post-graduate Diploma in Edible-Nest Swiftlet Conservation and Management from Cambridge Academy of Management (FCAM). He serves as the (b)(6) of CITES (Convention of International Trade of Endangered Species of Wild Flora and Fauna) Management Authority for the Sabah Government and an expert member of the IUCN Species Survival Commission (SSC) for Asian Rhinoceros, Bovidae, Crocodile, Asian Elephant, Primate and Swiftlet Specialist Groups.

**Economic Modeler:** (b)(6) (75% time)

(b)(6) will work to develop the avoided costs model and participate in the associated data collection. (b)(6) will work closely with the other Research Scientists to ensure the successful integration of other model components. She will document the processes and information needed to adapt the model to other contexts and ensure generalizability of the tool. (b)(6) investigates the economic costs associated with disease emergence. (b)(6) is involved with multiple projects, including a benefit cost analysis to determine whether captive-bred or wild-caught animals are a more economical choice for the pet industry, and an evaluation of a proposed tax on



internationally traded meat to generate revenue for global zoonotic disease surveillance. She is interested in the integration of economic theory with epidemiological models to study how the decisions people make affect the spread of infectious diseases.

**Economic Modeler:** TBD (33% time)

The economic modeler will work closely with the rest of the modeling and analytical team to support their activities in developing our analytical work and outreach. They will liaise closely with the DEEP FOREST team, and with partners in Sabah.

**Social Science Lead:** (b)(6) (16.6% time)

(b)(6) will work closely with the DCoP to assist in the supervision of the data collection, and connection of DEEP FOREST project data to the quantitative tools. She will work towards the integration of gender sensitive data for the models, and assist in the interpretation of the differential disease risks to men and women based on their daily activities.

(b)(6) brings a human dimension to EHA projects. An (b)(6) and (b)(6) by training, (b)(6) works to understand how human activities may be contributing to ecological changes and disease emergence. Her research interests lie within coupled social-ecological systems. Her current work examines the effects of forest fragmentation on mammal and viral communities, investigates the role of human behavior in disease risk, and she is a (b)(6) on EHA's Deep Forest projects in Brazil and Malaysia.

**DEEP FOREST Liaison:** (b)(6) (16.6% time)

(b)(6) will oversee the execution of the modeling strategy, collaborating with the other scientists and actively communicating and discussing the model developments with the CoP. (b)(6) will also draw on the project DEEP FOREST data and other data sources to assist with scenario building to project disease risks for different levels of land use change, and clearly communicate these findings to key stakeholders. (b)(6) is an (b)(6) with broad interests in biodiversity, evolution, behavior, and disease ecology. At EcoHealth Alliance, (b)(6) brings a diverse skill set and experience relevant to exploring the roles of biodiversity, land-use change, climate change and other socio-economic, demographic and environmental drivers in disease emergence and conservation. (b)(6) on EHA's Deep Forest projects in Brazil and Malaysia and is responsible for the coordination and alignment of Deep Forest project goals and methods across all three continents (South America, Africa and Asia).

**Senior Modeler:** (b)(6) (25% time)

(b)(6) will manage the disease and land cover geodatabases with particular attention to the assurance of data quality. The development of the statistical framework, and the use of Bayesian statistics to assess the likelihood of disease outbreak given differing levels of deforestation will be (b)(6) primary responsibility. (b)(6) is part of EcoHealth Alliance's modeling team, where he combines quantitative methods, spatial data and fieldwork to investigate the emergence of infectious diseases. He is interested in ecological niche modeling and applications of



Geographic Information Systems (GIS) technology for biodiversity research and conservation. He leads the GIS and modeling team for EHA's Deep Forest projects in Brazil and Malaysia.

**Program Coordinator for Health and Policy:** (b)(6) (16.6% time)

The Program Coordinator for Health and Policy will be actively involved in tracing the policy implications of the scientific findings. She will provide programmatic support for the project's health communication and policy outreach activities, including considerations around the social determinants of health as well as the formation of collaborations with non-traditional partners. She will also provide program evaluation expertise to assist in tracking achievement of project objectives. (b)(6) works with conservation, public health and medical communities to find synergies and opportunities to promote science-driven policy. Trained in public health, her work supports EHA collaborations with policy stakeholders at the international, national, and local level. Current projects include policies to consider health threats to biodiversity and practice-based prevention of EIDs.

**Grants and Contracts Manager:** (b)(6) (8.33% time)

The Grants and Contracts Manager will provide administrative oversight and support for the project's financial management, working closely with the CFO at EHA, and administrative staff funded through EHA core funds. She will ensure efficient transfer of funds to subrecipients, and financial reporting on all aspects of the contract. (b)(6)

(b)(6) has worked for over 15 years as an administrative assistant, manager and grants and contracts officer in a leading US University, and for the last 5 years at EHA where she acts as (b)(6) for EcoHealth Alliance's USAID EPT PREDICT subcontract.

## **PART 2. Institutional Capability.**

EcoHealth Alliance (EHA) is a science-based organization incorporated over 40 years ago, now working with local partners in over 30 countries at the nexus of public health, biodiversity conservation and international development. EHA has a staff of 35 at headquarters office in New York, including administrative staff (development, finance, marketing & communications), science staff (modelers, economists, social scientists, veterinarians, ecologists, analysts, IT researchers etc), outreach staff (educators, researchers, communication staff). EHA also has international staff of in-country field scientists, social scientists, program managers and country leads based in around 30 countries, including Malaysia (both peninsular and Sabah). EHA has an extensive record of publishing high quality, peer-reviewed papers, journals, briefing documents and reports. Given that a primary indicator of success in this project is based on utilization of data and findings by decision makers, EHA's demonstrated expertise in producing highly utilized and understandable science-based outputs will contribute significantly to achieving both project goals and provide objective methods for tracking project utilization of project findings.

### *Work experience with USAID EPT and DEEP FOREST*



EHA is a core partner of the USAID EPT PREDICT project, and staff at EHA include the PREDICT (b)(6) component of PREDICT (Dr. Peter Daszak), (b)(6) the majority of the PREDICT modeling staff, (b)(6) (b)(6) (b)(6) EcoHealth Alliance formulated the concept and design of the PREDICT DEEP FOREST project, and is the implementation lead at our tropical forest sites along land use gradients in Sabah, Malaysia and Brazil. At these sites, EHA staff are sampling high-risk wildlife, co-ordinating surveys of human contact and behavior (in collaboration with EPT PREVENT), and managing viral testing and capacity building. The aims of DEEP FOREST have direct relevance to the current project, and are to understand how land-use change affects 1) patterns of biodiversity, 2) patterns of viral diversity and 3) patterns of human occupancy and behavior that influence contact rates with wildlife. The human behavioral data gathered includes gender-specific issues of relevance to EID risk, and, similarly, opportunities for gender empowerment and health savings. In addition, EHA scientists are currently working on the DEEP FOREST contact surveys, and other social science aspects of its projects such as our IDRC-supported 'Pontal' project in Brazil.

#### *Work Experience in Modeling Land-use Change*

EcoHealth Alliance is a leader in modeling and analyses of the emergence of new diseases. EHA staff led the development of analytical tools and models resulting in the "Hotspots of Emerging Diseases", have conducted extensive fieldwork on emerging diseases in tropical regions, and have led the thinking on the relationship of land-use change and disease emergence. Our portfolio of projects that model disease emergence risk, land-use change, and economic valuation is outlined in below. EHA is a global leader in developing the science, analytical frameworks and field studies to understand the relationship between land use change and disease emergence; in applying spatial analyses to understand drivers of emergence; in the theory of the drivers of zoonotic EIDs; in climate change modeling with respect to public health; in valuing the economic damages associated with EIDs; in understanding and estimating the global wildlife trade and their impacts on public health; and in understanding the ecosystem services associated with EIDs. EHA staff are members of the HEAL (Health and Ecosystems: Analysis and Linkages) project

([www.onehealthcommission.org/en/resources/health\\_ecosystems\\_analysis\\_of\\_linkages\\_heal/](http://www.onehealthcommission.org/en/resources/health_ecosystems_analysis_of_linkages_heal/)); Dr. Daszak leads the DIVERSITAS ecoHEALTH project ([www.diversitas-international.org/activities/research/ecohealth](http://www.diversitas-international.org/activities/research/ecohealth)), both of which have specific goals of understanding the ecosystem services related to zoonoses.

#### *Work Experience Modeling Disease Emergence*

The thrust of this RFA corresponds directly with the analytical and modeling work EHA is conducting on understanding and predicting disease emergence. For example, EHA modelers have shown that the underlying drivers of disease emergence vary depending on region, but in the place where most zoonoses emerge (the Tropics, including SE Asia) are primary land use change, agricultural intensification, or secondary factors associated with these (e.g. bushmeat), see **Figure 1**, below.

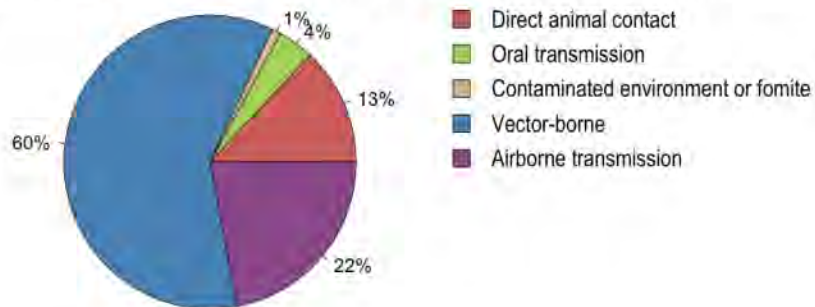


**Figure 1:** EHA modeling staff have analyzed the underlying causes of all EIDs since 1940. This figure shows that disease emergence in the Asian region, and the Tropics globally, is dominated by land use

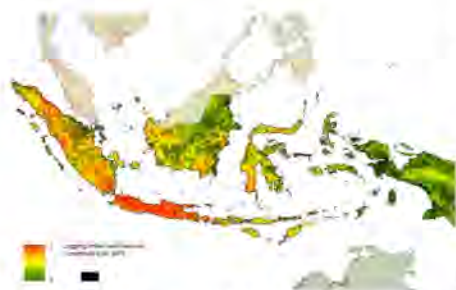
change, agricultural intensification, and secondary factors these lead to.



The best models require significant data inputs to parameterize. In the DEEP FOREST sites in Borneo and Brazil (and the ‘Pontal’ project in Brazil), EHA is generating data of direct relevance to the work described in this RFA, including: the relative abundance and diversity of bats, primates, and rodents; the relative intensity of contact among humans and wildlife; and the diversity of known and unknown zoonoses. The collection of these data is driven firstly by models and analyses that identify the most important issues to target. For example, in regions such as SE Asia, where land use change brings people into contact with wildlife reservoirs, EHA has identified the most important transmission pathways that pathogens have previously used to spillover into people (**Figure 3**, below).



**Figure 3:** The most significant pathways that pathogens use to emerge in people in areas under intensive land-use change



Finally, EHA manages a portfolio of projects funded by NSF, NIH, DOD and other agencies which specifically analyze the risk of a range of zoonoses emerging in Tropical regions. These include models of how spillover events develop from stuttering chains of zoonotic spillover, then chains of small clusters of human cases, to epidemic, then pandemic spread. We are currently comparing models that

involve direct wildlife to human exposure to models that involve domestic animals as intermediate hosts. We are looking into this for henipaviruses, influenza viruses, coronaviruses and other critical zoonoses.

**Figure 4:** Map of Logging, tree crop and timber concessions in Indonesia. EHA scientists are actively working on mapping these activities with respect to the emerging disease hotspots across tropical Asia, Africa and America.

#### *Work Experience in Economic Modeling*

EHA has a program to understand the economic incentives that might be used to mitigate against globally emerging pandemics. Projects include modeling economic damages due to EIDs under different policy scenarios, the trade-offs between preserving ecosystems and the disease regulation services they provide, and cost-benefits of converting land for other productive activities. EHA leads the DEED (Diversity, Economics, EcoHealth and Emerging Diseases) project that is part of the UNESCO-ICSU DIVERSITAS cluster. This project is actively engaged in:

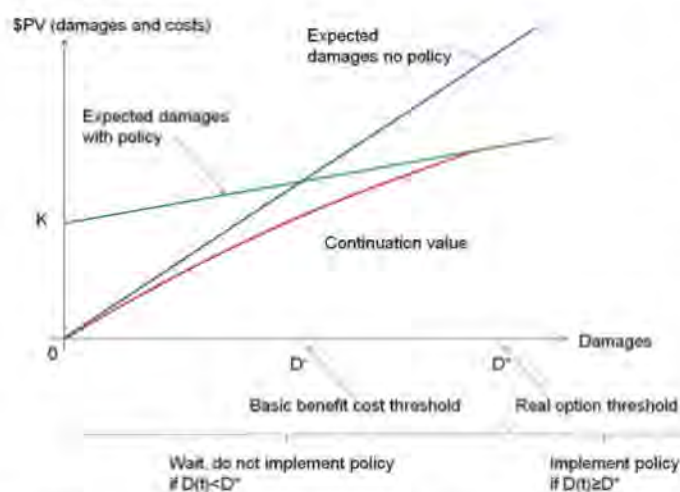
1. Valuing the Ecosystem Services from forests within EID hotspots and comparing the benefits of preserving the ecosystem to those from converting the land for another productive purpose



2. Valuing the damages associated with disease emergence
3. Evaluating systems of “EcoHealth Credits” that might be traded alongside or integrated into the trading of carbon credits (e.g., as per biodiversity, REDD+).
4. Using contingent valuation methodology—an approach that can also be applied to assign a value to ecosystem services—to gather data on individuals’ willingness-to-pay to avert a pandemic.
5. Understanding the global relevance of the ‘Dilution Effect’ by which biodiversity conservation may help regulate zoonotic disease risk.

This and other associated work by members of our team has resulted in scientific papers that argue the case for preventive rather reactive responses to EID and other risks (Murray *et al.*, 2012), use climate change (adaptation vs. mitigation) approaches to address pandemic threat (Pike *et al.*, in review), evaluate strategies to tax livestock production as a way to reduce pandemic potential (Elwood *et al.*, in review), and evaluate a credit trading system as a way to reduce the risk of pandemics (Tutunjian *et al.*, in review).

Just like climate change, the risk of disease emergence from regions like Sabah can be viewed as a global commons issue (in this case a public ‘bad’, rather than a ‘good’), which can either be mitigated against, or adapted to. Here mitigation involves dealing with underlying causes of EIDs at source (e.g. the proposed work in this RFI) and adaptation involves reliance on current global surveillance, and drug and vaccine development. We have developed a stochastic dynamic model that examines the optimal timing in which to implement pandemic mitigation and/or adaptation policies (**Figure 5, below**). We used real options methodology, data on the incremental rise in EIDs and their associated damages, and the cost of current global health systems, to optimize the delivery of global policies to reduce the damages from EIDs. Our model demonstrates that mitigation projects, which address the underlying causes of pandemics at source, more efficiently reduce the damages associated with pandemics than adaptation. This experience and modeling approach has a direct application to valuing ecosystem services as not only the current value of services should be examined, but also the ability of the ecosystem to maintain these services over time.



**Figure 5:** Stopping model for pandemic prevention. Y-axis: net present value of expected damages of an EID outbreak plus the cost,  $K$ , of a policy if implemented. X-axis: expected damages/time. Blue line: expected damages if policy is not implemented and the value of waiting (e.g. by more knowledge gained) is not considered. Green line: EID damages if a policy with cost,  $K$ , is implemented. If the value of waiting is ignored,

$D\sim$  is the threshold at which a policy should be implemented. The red line, known as the



‘continuation value’, illustrates the expected damages under business as usual. The decision model simply takes the currently experienced damage, a point on the x-axis, and determines which of the three lines is lowest (has lowest expected present damages and costs). For damages less than  $D^*$  it is optimal to “continue” to wait. For all damages above  $D^*$  it is optimal to implement the policy.  $D^*$  is the optimal threshold. Our results show that the waiting time to implement a global EID mitigation policy is between 4 and 24 years, after which it will be too costly to reduce the inexorable rise in EID emergence.

#### *Work Experience in Ecosystem Services*

The first step to a successful project that provides incentives to reduce, change or otherwise affect commercial activities such as logging, agricultural development and mining is to provide an industry-specific economically viable case. EHA is currently involved in key activities of direct relevance to this RFA. Via subcontract from PREVENT, EHA led the analysis and provided the scientific case for a white paper on reducing EID risk in the extractive industries.



**Figure 6:** Global EID risk map, overlaid with data on timber concessions and active logging, mining and other extractive industry activities

We also co-hosted a meeting at Chatham House that brought numerous stakeholders from the extractive industries together around the issue of EID risk. This included producing global maps of EID risk and mining/logging concessions (**Figure 6**, above).

EHA staff members also sit on the EPT Extractive Industries Working Group. This group has developed tools to incorporate zoonotic EIDs into Health Impact Assessments, and assess potential risk in sites with active extraction. These include developing measures for risk prevention and management that reduce likelihood of exposure to potential health hazards, strengthening of systems for monitoring and responding to disease-related risks, and engagement of local health officials in risk control. In addition, EHA has active projects with other leaders in the extractive industries, chemical industries, agriculture/livestock, and palm oil production, which can be harnessed for the work in this RFA.

#### *Work Experience in Social Science and Surveys*

EHA is working closely with EPT partner PREVENT to develop a standard survey approach to assess and quantify the types and frequencies of human-animal contact in each of our DEEP FOREST sites. These contact surveys are adapted to the country, sub-population and setting in which they are implemented. Already, EHA has piloted over 100 surveys in settlement communities in the Atlantic Forest, Brazil. In each site, these surveys are being used to quantify human contact with potential wildlife reservoirs with particular attention to bats, rodents, and primates as well as other types of wild and domestic animals to which people are frequently exposed. Results from intensive



interviewing and behavioral characterization will determine how this fundamental but poorly quantified measure might vary with land-use practices and intensity of disturbance. Quantifying contact will also provide a basis for determining which populations are at higher risk and what types of behavior change might be needed for mitigation strategies. In 2013, EHA will implement the DEEP FOREST human-contact survey in our sites in the Brazilian Amazon. In Sabah, PREVENT will collect human-wildlife contact data in close coordination with EHA, and in Uganda PREVENT will collect similar data in coordination with EHA and UCDavis. Data from both Brazil and Malaysia sites will generate critical information on key risk interfaces and the potential risk of spillover for each defined ecosystem. We also have access to active extraction sites, through our contact with the SAFE project (Stability of Altered Ecosystems), which is conducting one of the world's largest ecological experiments to understand the ways in which logging, deforestation and forest fragmentation modify the functioning of tropical rainforests and impair their ability to deliver important ecosystem services.

#### Work Experience in REDD+ initiatives

EHA is engaged in a project to develop a trading system for 'EcoHealth Credits' that adapts to the features of REDD+. In its original form, REDD (Reducing Emissions from Deforestation and forest Degradation) was designed as a climate change mitigation tool based on the sale of carbon credits to encourage countries to reduce deforestation by selling the value of the carbon that would otherwise have been released. REDD+ is a more recent development that broadens the scope to include additional co-benefits of protecting carbon stocks, e.g., protecting biodiversity and improving livelihoods, after it was recognized that carbon investments could be manipulated to better achieve numerous targets for traditionally resource-poor but deforestation-related issues (e.g., biodiversity protection, livelihood enhancements) without compromising the overall efficacy of the program for climate change mitigation. It has also been suggested that optimization procedures could minimize the conflicts with other development goals, such as agricultural production and logging. Our analyses suggest that health could conceivably be considered as one of these additional co-benefits, which could influence the way that REDD+ funds are allocated or influence the perception or relative valuation of potentially conflicting development goals. The next step will be to develop ways that health benefits of intact forests can be integrated into a market-based instrument – something which is directly covered in this RFA, and which EHA has expertise in doing for EIDs.

#### Experience Implementing Projects in the Region

EHA has worked intensively in Malaysia since 1998, where it maintains an office. Our extensive partnerships and collaborations have led directly to implementation of a Zoonosis Technical Working Committee comprised of the Ministry of Health Malaysia, the Department of Veterinary Services, the Department of Wildlife and National Parks (PERHILITAN) and EHA as part of EPT PREDICT. This committee reports directly to the Malaysian government on the control of zoonotic diseases. In 2000, with our partners in the Dept. of Veterinary Services, the Veterinary Research Institute, Ministry of Agriculture, and the Department of Wildlife and National Parks (PERHILITAN) EHA scientists set up a large-scale international study on the ecology of Nipah virus. This has led to significant scientific outputs, changes to government regulations on pig farming, and regional approaches to zoonotic surveillance.

In 2012 we collaborated with our partners at Sabah Wildlife Department to create the Sabah Wildlife Health Unit that is dedicated to disease surveillance activities and to set up the Wildlife Health, Genetic and Forensic Laboratory. These partnerships have historically focused not only on scientific research, but capacity-building, training, and public outreach to communicate our science. In the past five years, we have expanded our collaboration to include the Ministry of Health and the National Public Health Laboratory (NPHL), under a program looking at the risk of zoonotic disease transmission to people highly exposed to wildlife.

EcoHealth Alliance has also continued to focus on conservation in Malaysia. EHA scientists have worked with PERHILITAN to reduce hunting pressures on flying foxes and to raise awareness of the importance of these animals. In order to preempt harassment of *Pteropus hypomelanus* bats due to their association with Nipah virus, an outreach strategy was developed for a local primary school, located near the site of EHA's long-term bat surveillance Nipah virus study on Malaysia's Tioman Island. The take home message from the talks, games and leaflet was that flying foxes play a crucial role in seed dispersal and the pollination of forest and commercial plants. Malaysian fruits including Durian (*Durio spp.*) and Petai (*Parkia speciosa*) depend on flying foxes for pollination as does much of the timber Malaysia exports, a fact of which many Malaysians were unaware.

In 2012, we partnered with the Malaysian Ministry of Health to develop outreach education material including fact sheets, and pamphlets on zoonotic infectious diseases to provide information on potential risks and biosafety measures, as well as common routes of disease exposure. We are also working closely with MOH to develop standard operating procedures for the Healthy Hunters program. To date, EcoHealth Alliance has trained over 110 members of the PREDICT team in Malaysia, including staff from PERHILITAN, VRI, several local universities and NGOs, and Sabah Wildlife Department. We have also transferred technologies to PERHILITAN, VRI, and SWD to run molecular diagnostic assays for viral family detection in wildlife samples as an initial screen for viruses with zoonotic potential.

#### **Home-office backstopping and its purposes.**

The finance department at EHA will manage the cash flow from USA to Malaysia. EHA is a certified USAID prime contractor and subject to federal audits, for which it is considered a low risk organization. The Sub-recipients for these funds – DCOP, Sabah Wildlife Department, University Malaysia Sabah, Department of Veterinary Services and Department of State Health Sabah are all know entities that EHA has worked with in the past. EHA will have their certified public accountant manage the project accounts with oversight from the Chief Financial Officer. The accounts for the project will be submitted for annual external audit. The EHA office will also be responsible for the scientific and technical review and will lead the modeling effort.

The (b)(6) has 8 years' experience managing large budgets and large field projects with multiple partners will receive funds from the EHA Finance Department. The DCOP will be responsible for the fiscal management of all funds in Malaysia associated with this contract to cover operating expenses and to support the activities of



stakeholders involved in this project. The DCOP will track project expenditures to ensure fiscal responsibility and prepare financial data for reporting. For stakeholders who may require regular financial support, such as to fund the running of the Center of Excellence we will establish at University Malaysia Sabah, a contract would be signed between DCOP and the stakeholder.

### **Sub-recipient capabilities and expertise**

#### Univesiti Malaysia Sabah (UMS)

UMS strives to be an innovative university of global standing UMS strives to achieve academic excellence and international recognition through its attention to learning and teaching, research and publications, social services and balance in knowledge specialization. The university also prioritizes the personal growth of its students, resulting in greater innovation and productivity for the benefit of society and the nation as a whole. The School of Business and Economics, was established in 1995 with intention of fulfilling the country's need for managers and entrepreneurship in various areas of business to ensure that Malaysia achieves its objective to be an industrialized country by 2020. SBE seeks to ensure that its academic programs are update with the most recent research finding and by an understanding of contemporary business, government and management practices. As a result of its proactive policy, the school is capable of disseminating the recent development in knowledge in business and economics to its students and other audiences. The School has already earned recognition in providing quality MBA among profesional in the State and hopes to gain international recognition in the years to come.

UMS will be creating the Center for Development and Health under this project inline with it's other existing Centers of Excellence such as the Institute for Tropical Biology and Conservation. The ITBC works at various sections of the society including the traditional communities, government agencies, non-governmental organizations and relevant ministries, ensuring a fair bit information exchange, technology transfer, assistance and smart-partnerships. The institute has developed a tradition of working with many partners both within and outside Malaysia.

#### The Sabah Wildlife Department (SWD)

The Sabah Wildlife Department works under the authority of the Sabah Ministry for Tourism Development, Environment, Science and Technology. The Wildlife Department has its headquarter in Kota Kinabalu and it has a number of district offices, centers and stations throughout the state. Over 230 staff members work in the SWD. The department is responsible for implementation and administration of the Sabah Wildlife Conservation Enactment, 1997. Under this Enactment the department conserves and regulates wildlife utilization in Sabah and it manages a number of protected areas. The department also implements the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as well as contribute to the implementation of the international convention of Biological Diversity and to a number of other international, regional and bilateral agreements. The objective of the SWD is to manage the State's wildlife resources for the benefit of the people of Malaysia in general and of Sabah in particular. The SWD is the lead local partner for the USAID EPT program, working directly with both PREDICT and PREVENT. As such, they are also the key implementation partner for the DEEP FOREST project. For IDEEAL, SWD will serve to bring together relevant

stakeholders to participate in the efforts of the UMS Center for Development and Health to strengthen the center of excellence platform. SWD will also prove to be the key in liaising with other Sabah government departments for obtaining additional data and input for modeling and to engage in policy outreach efforts.

**References for Annex C:**

- Elwood, S., *et al.* Evaluation of a levy on internationally traded meat to finance global disease surveillance. Emerging Infectious Diseases, in review.
- Groot, R. D., *et al.* (2010). "Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation." The Economics of Ecosystems and Biodiversity (TEEB): Ecological and Economic Foundations
- Murray, K. A., *et al.* (2012). "Cooling off health security hot spots: Getting on top of it down under." Environment International **48**(0): 56-64.
- Pike, J., *et al.* (2013). "Economic optimization of a global strategy to reduce the pandemic threat." Nature, in review.
- Tutunjian, C., *et al.* A credit trading system for pandemic prevention. EcoHealth, in review.





Our Ref : 0199-05/13

23 May 2013

Dr. Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA.

Dear Dr. Daszak,

I, (b)(6) of Malaysian Palm Oil Council (MPOC) will be very pleased to collaborate on the application being led by EcoHealth Alliance to implement the USAID Land Use Change and Disease Emergence program should our team be chosen by USAID to conduct the work. Should EcoHealth Alliance be successful in its application, I have agreed to participate in activities associated with this project including acting as a resource for information and insight, based on my expertise, including assisting in identifying and locating relevant and available data sets, to help achieve the aims of this project. I will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings, and advise or participate in graduate student training activities.

This letter conveys my interest and commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

Sincerely,

(b)(6)

for CEO MPOC



Please visit MICCOS 2013

Sustainable Commodity for a Better Tomorrow  
24 – 27 October 2013; MAEP Serdang, Malaysia

[www.miccos.com.my](http://www.miccos.com.my)

**MALAYSIAN PALM OIL COUNCIL (192835-K)**

2nd Floor, Wisma Sawit, Lot 6, S56, Jalan Perbandaran, 47301 Kelana Jaya, Selangor Darul Ehsan, Malaysia.

Tel: 603-7896 8787 Fax: 603-7896 1111





## HOSPITAL QUEEN ELIZABETH

KARUNG BERKUNCI NO. 2029

88586 KOTA KINABALU

SABAH, MALAYSIA

Tel: 088-517555 Faks: 088-211999/318605

Laman Web: <http://qeh.moh.gov.my>



SIRIM

CERTIFIED MS ISO 9001 : 2008  
Registration No. AR 3673



*Ruj. Tuan :*

*Ruj. Kami :*

*Tarikh :*

Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

20 May 2013

Dear Dr. Daszak,

I, and the Infectious Disease Unit, Queen Elizabeth Hospital, Kota Kinabalu, Sabah, will be very pleased to collaborate exclusively on the application being led by EcoHealth Alliance to implement the USAID Land Use Change and Disease Emergence program should our team be chosen by USAID to conduct the work.

Should EcoHealth Alliance be successful in its application, I have agreed to participate in activities associated with this project including acting as a resource for information and insight, based on my expertise, including assisting in identifying and locating relevant and available data sets, to help achieve the aims of this project. I will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings, and advise or participate in graduate student training activities.

This letter conveys my interest and commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

**“KAMI SEDIA MEMBANTU”**

*(Sila catatkan rujukan surat hospital ini apabila berhubung)*

USAID-00896

Sincere

(b)(6)

(b)(6)

Queen Elizabeth Hospital,  
Kota Kinabalu  
Sabah, Malaysia



Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

Dear Dr. Daszak,

This letter is to confirm that the Kinabatangan Orang-utan Conservation Programme run by the French NGO HUTAN will be very pleased to collaborate on the application being led by EcoHealth Alliance to implement the USAID Land Use Change and Disease Emergence program.

Should EcoHealth Alliance be successful in its application, I have agreed to participate in activities associated with this project including acting as a resource for information and insight, based on my expertise, including assisting in identifying and locating relevant and available data sets, to help achieve the aims of this project. I will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings, and advise or participate in graduate student training activities.

This letter conveys my interest and commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

Sincerely,

(b)(6)

(b)(6)

Kota Kinabalu  
15.05.2013



PO Box 17793, 88874 Kota Kinabalu, Sabah, Malaysia.

T: 6088 413 293 F: 6088 413 293 w: [www.hutan.org.my](http://www.hutan.org.my)

USAID-00898



**LEAP** – Facilitating projects, partnerships & exchanges that provoke sustainable ecological co-existence

Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

22 May 2013

Dear Dr. Daszak,

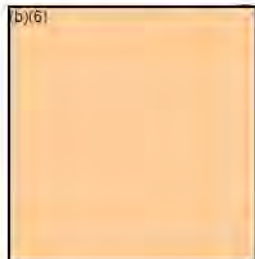
#### LETTER OF SUPPORT

LEAP (Land Empowerment Animals People) will be very pleased to collaborate with EcoHealth Alliance on its implementation of the USAID Land Use Change and Disease Emergence program should EcoHealth Alliance be chosen by USAID to conduct the work in Sabah, Malaysia.

We are happy to share our experience and expertise, provide input through meetings and workshops, and to help to connect EcoHealth to relevant stakeholders within our network.

This letter conveys our support for making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

Sincerely,



LEAP





**DANAU GIRANG FIELD CENTRE**

Kota Kinabalu, 21 May 2013

Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street - 17th Floor  
New York, NY 10001, USA

Dear Dr Daszak,

I, and Danau Girang Field Centre, have been successfully working with EcoHealth Alliance for the last two years in Sabah. I am very pleased to continue this collaboration on this new application proposed by EHA to USAID to implement their Land Use Change and Disease Emergence program. Should EHA be successful in its application, I agree to participate in activities associated with this project including acting as a resource for information and insight, based on my expertise, and assisting in identifying and locating relevant and available data sets. I will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings. I will also be happy to advise or participate in graduate student training activities, as long as funding is provided for such activities.

This letter conveys my interest and commitment to making this initiative a success. I am excited to be involved in this effort to develop evidence-based tools for utilisation in reducing deforestation, associated carbon emissions, and risk of disease emergence. I look forward to continuing working with EHA, Sabah Wildlife Department and USAID on this important project.

Yours sincerely,



Danau Girang Field Centre, Sabah, Malaysia





**DIRECTOR GENERAL OF VETERINARY SERVICES**

Department of Veterinary Services  
Ministry of Agriculture and Agro Based Industry  
Level 2, Podium Block Lot 4G1, Wisma Tani  
Persiaran Perdana, Precinct 4  
62630 PUTRAJAYA  
MALAYSIA



Tel: 603-8870 2201  
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Email: [kp@dvs.gov.my](mailto:kp@dvs.gov.my)

Dr. Peter Daszak  
President, EcoHealth Alliance  
460 West 34th Street – 17th floor  
New York, NY 10001  
USA

*Dear Sir*

**LETTER OF COMMITMENT FOR THE USAID LAND USE CHANGE AND DISEASE EMERGENCE PROGRAM**

The Department Of Veterinary Services Malaysia will be very pleased to collaborate exclusively on the application being led by EcoHealth Alliance to implement the USAID Land Use Change and Disease Emergence program should our team be chosen by USAID to conduct the work.

2. Should EcoHealth Alliance be successful in its application, we have agreed to participate in activities associated with this project including acting as a resource for information and insight, based on our expertise, including assisting in identifying and locating relevant and available data sets, to help achieve the aims of this project. We will also participate in occasional meetings at local partner institutions to discuss findings of this study, strategies for educational outreach and dissemination of findings, and advise or participate in graduate student training activities.

3. This letter conveys the Department's commitment to making this initiative a success. We are excited to be involved in this effort to develop evidence-based tools for utilization in reducing deforestation, associated carbon emissions, and risk of disease emergence. We



look forward to working with EcoHealth Alliance, Sabah Wildlife Department, and USAID on this important project.

Sincerely,



Malaysia.

- Cc, –
- 1. Deputy Director General Of Veterinary Services (Developement)
  - 2. Deputy Director General Of Veterinary Services (Veterinary Health)
  - 3. Director, Research Division, DVS Malaysia.



**Annex D: Past Performance Information**

<b>PREDICT - Wildlife SMART Surveillance</b>
PERFORMANCE REPORT - SHORT FORM
<b>PART I: Award Information</b> (to be completed by Prime)
<b>1. Name of Awarding Entity:</b> USDS AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)
<b>2. Award Number:</b> GHN-A-00-09-00010-00
<b>3. Award Type:</b> Grant
<b>4a. Award Value (or subagreement value):</b> (b)(4)
<b>4b. Annual amount received for each of last 3 years:</b> (b)(4) (b)(4)
<b>4c. Award beginning and end dates:</b> 10/01/09-09/30/14
<b>5. Problems:</b> (if problems encountered on this award, explain corrective action taken): No significant problems encountered
<b>6. Contacts:</b> (Name, Address, Telephone Number and E-mail address)
<b>6a.</b> (b)(6) (b)(6) Washington, DC 20004, (b)(6) @usaid.gov
<b>6b. Technical Officer (AOTR/COTR):</b>
<b>6c. Other:</b>
<b>7. Recipient:</b> University of California-Davis/EcoHealth Alliance
<b>8. Title/Brief Description of Product/Service Provided:</b> PREDICT - Wildlife SMART Surveillance/PREDICT Project to pre-empt at the earlier stages possible, zoonotic diseases that impose significant threat to public health.
<b>9. Information Provided in Response to RFA/RFP No.:</b> USAID-RDMA-RFA-486-13-0000001 Land Use Change and Disease Emergence Program
<b>10. Key project accomplishment and results to date:</b> <b>Analyzing and predicting disease emergence</b> <ul style="list-style-type: none"> <li>Analyzed role of land use change as driver of disease emergence</li> <li>Produced economic cost-benefit analysis of adaptation vs. mitigation to Pandemic Threats</li> <li>Produced version 2 of EID Hotspots map</li> <li>Developed online wiki for EID emergence data ("The Sicki Project")</li> <li>Designed and launched the DEEP FOREST Project to assess disease emergence across land use gradient</li> <li>Characterized risk interfaces &amp; human contact potential for transmission in different social and ecological contexts</li> <li>Produced predictive maps of Pandemic risk based on air travel/trade</li> </ul> <b>Expanding the One Health Workforce</b> <ul style="list-style-type: none"> <li>Trained over 1,600 people in surveillance, diagnostics &amp; outbreak response</li> <li>Coordinating with 59 ministries in 20 countries</li> <li>Partnering with US agencies &amp; foreign governments to establish regional networks for wildlife health and laboratory diagnostics</li> </ul>

**Optimizing surveillance & response**

- Standardized animal sampling protocols to ensure safe wildlife handling
- Improved cold chain access in remote areas
- Established scientifically-justifiable & practically implementable sampling goals to identify new viruses and evaluate diversity in regions & hosts
- Responded to deadly outbreaks incorporating animal & environmental best practices
- Identified efficient diagnostic paradigm for mystery diseases

**Providing proof of concept**

- Sampled 35,000 animals
- Discovered 200 viruses in genera or families known to cause zoonotic epidemics
- Built capacity for diagnostic testing in 20 labs
- Working toward sustainable improvements in 33 labs in total
- Used new viral data to help assess risk & respond to outbreaks
- Published 24 peer-reviewed scientific publications in high impact journals (*PNAS*, *Nature*, *The Lancet* etc.)

<b>Risk of Viral Emergence from Bats</b>
PERFORMANCE REPORT - SHORT FORM
<b>PART I: Award Information</b> (to be completed by Prime)
<b>1. Name of Awarding Entity:</b> NIAID Non-Biodefense Emerging Infectious Diseases
<b>2. Award Number:</b> 5R01AI079231
<b>3. Award Type:</b> Grant
<b>4a. Award Value (or subagreement value):</b> (b)(4)
<b>4b. Annual amount received for each of last 3 years:</b> (b)(4)
<b>4c. Award beginning and end dates:</b> 09/18/08-08/31/13
<b>5. Problems:</b> (if problems encountered on this award, explain corrective action taken): No significant problems encountered
<b>6. Contacts:</b> (Name, Address, Telephone Number and E-mail address)
<b>6a. Agreement Officer:</b> (b)(6), NIAID, NIH; (b)(6) @niaid.nih.gov, (b)(6)
<b>6b. Technical Officer (AOTR/COTR):</b>
<b>6c. Other:</b> (b)(6) @niaid.nih.gov, (b)(6)
<b>7. Recipient:</b> EcoHealth Alliance
<b>8. Title/Brief Description of Product/Service Provided:</b> 'Risk of Viral Emergence from Bats'/ Characterized the diversity of bat viruses globally; developed predictive models to look at areas of the globe at greatest risk from zoonotic bat viruses and identify the factors that drive cross-species transmission in bats; and estimating the unknown viral richness in bats globally.
<b>9. Information Provided in Response to RFA/RFP No.:</b> NIH PA-07-246
<b>10. Key project accomplishment and results to date:</b>
<p><b>Targeted sample collection for bat viral discovery</b></p> <ul style="list-style-type: none"> <li>Collected over 2,200 samples from bats targeted by high-risk species and geography.</li> <li>Globally, over 12,000 samples from ~100 bat species have been collected. 100s of novel viruses from 10 viral families have been identified.</li> </ul> <p><b>Bat Viral Discovery and 'Deep Sampling'– Bangladesh Case Study</b></p> <ul style="list-style-type: none"> <li>Ran over 16,000 PCR assays for 12 viral families, and discovered 63 putative novel viruses in Bangladesh alone.</li> <li>Non-bat viruses were detected in fruit bats as part of this study, including both avian and bovine coronaviruses.</li> </ul> <p><b>Viral Discovery Curves – assessing total known and unknown viral diversity</b></p> <ul style="list-style-type: none"> <li>Viral discovery curves used to estimate total diversity of mammal viruses.</li> <li>63 novel viruses that include 11 new Paramyxoviruses and 28 new Adenoviruses have been identified.</li> </ul> <p><b>Predicting risk of bat virus emergence</b></p> <ul style="list-style-type: none"> <li>Identified significant host and virus traits that predict whether or not a virus will be shared among bat species.</li> </ul>



- Results showed that phylogenetic distance between bat host species is a strong predictor of viral sharing.
- Primates, rodents, bats and lagomorphs have significantly higher proportions of viruses shared with humans than other mammal Orders.
- Mapped global pandemic risk from the emergence of all direct- and vector-transmitted zoonotic viruses using airline travel data, zoonotic disease hotspot risk maps, and per capita health care.

**Training and outreach**

- Trained >230 people in-country in methods of bat capture, safe handling, species identification, proper use of Personal Protective Equipment (PPE), and minimally-invasive sample collection.
- Held a large hands-on training in Central Thailand for 32 people, which included veterinary and forest students from three universities in Thailand, staff and veterinarians from the Department of National Parks Thailand.
- EcoHealth Alliance with FAO co-edited and published a volume on best practices for investigating zoonoses from bats which is freely available online.
- Over 20 peer-reviewed papers have been published under this award.



<b>HSD: Collaborative Research: Human Related Factors Affecting Emerging Infectious Diseases.</b>
PERFORMANCE REPORT - SHORT FORM
<b>PART I: Award Information</b> (to be completed by Prime)
<b>1. Name of Awarding Entity:</b> National Science Foundation (NSF)
<b>2. Award Number:</b> BCS-0826779
<b>3. Award Type:</b> Grant
<b>4a. Award Value (or subagreement value):</b> (b)(4)
<b>4b. Annual amount received for each of last 3 years:</b> (b)(4)
<b>4c. Award beginning and end dates:</b> 10/01/08-01/31/12
<b>5. Problems:</b> (if problems encountered on this award, explain corrective action taken): No significant problems encountered
<b>6. Contacts:</b> (Name, Address, Telephone Number and E-mail address) Peter Daszak
<b>6a. Agreement Officer:</b> (b)(6) @nsf.gov
<b>6b. Technical Officer (AOTR/COTR):</b>
<b>6c. Other:</b>
<b>7. Recipient:</b> EcoHealth Alliance
<b>8. Title/Brief Description of Product/Service Provided:</b> 'HSD: Collaborative Research: Human Related Factors Affecting Emerging Infectious Diseases'/The goal of this project was to understand the process by which anthropogenic changes drive patterns of disease emergence globally, and the development of predictive models for disease emergence and pandemic spread.
<b>9. Information Provided in Response to RFA/RFP No.:</b> USAID-RDMA-RFA-486-13-0000001 Land Use Change and Disease Emergence Program
<b>10. Key project accomplishment and results to date:</b> <ul style="list-style-type: none"> <li>Produced first ever global disease hotspot map</li> <li>Analyzed risk of disease emergence from agricultural production and food</li> <li>Collated over 20 globally-gridded, largescale datasets on socio-economic factors involved in disease emergence</li> <li>Published papers in <i>Science</i>, <i>Nature</i> and other high-impact journals.</li> </ul>

<b>EcoHealthNet: Ecology, Environmental Science and Health Research Network</b>	
PERFORMANCE REPORT - SHORT FORM	
<b>PART I: Award Information</b> (to be completed by Prime)	
<b>1. Name of Awarding Entity:</b> National Science Foundation (NSF)	
<b>2. Award Number:</b> 0955897	
<b>3. Award Type:</b> Grant	
<b>4a. Award Value (or subagreement value):</b>	(b)(4)
<b>4b. Annual amount received for each of last 3 years:</b>	(b)(4)
<b>4c. Award beginning and end dates:</b> 07/01/10-08/31/15	
<b>5. Problems:</b> (if problems encountered on this award, explain corrective action taken): No significant problems encountered	
<b>6. Contacts:</b> (Name, Address, Telephone Number and E-mail address)	
<b>6a. Agreement Officer:</b>	(b)(6)
4201 Wilson Blvd., Natl. Science Foundation, Arlington, VA 22230; Tel (b)(6)	
Email (b)(6) @nsf.gov	
<b>6b. Technical Officer (AOTR/COTR):</b>	
<b>6c. Other:</b>	(b)(6)
<b>7. Recipient:</b> EcoHealth Alliance	
<b>8. Title/Brief Description of Product/Service Provided:</b> 'EcoHealthNet: Ecology, Environmental Science and Health Research Network'/Its aim is to provide multi-disciplinary training to graduate students and early career scientists from the US and abroad in the field of disease ecology.	
<b>9. Information Provided in Response to RFA/RFP No.:</b> USAID-RDMA-RFA-486-13-0000001 Land Use Change and Disease Emergence Program	
<b>10. Key project accomplishment and results to date:</b>	
<ul style="list-style-type: none"> <li>Bringing together experts from top academic, government, and non-governmental organization representing fields of ecology, veterinary medicine, medicine, GIS, mathematical modeling, and epidemiology together for a 1-week didactic and applied training workshop attended by 20 of the best and brightest graduate students competitively selected from programs around the world.</li> <li>10 funded applied research experiences for students each year which includes a mentored field placement for up to 3 months conducting research within a larger, funded ecohealth research project.</li> <li>Trained over 100 students from more than 20 countries.</li> <li>Workshops have included disease mapping and modeling, which was held at Johns Hopkins Bloomberg School of Public Health; Epidemiology and outbreak response co-hosted by the University of Wisconsin and the USGS National Wildlife Health Center, and this year will be at on Zoonoses and food safety at the University of Minnesota.</li> <li>Past workshop attendees have stayed connected through an EcoHealthNet alumni network and many EcoHealth Net scholars have graduated and acquired jobs with science-based research organizations.</li> </ul>	



<b>The Ecology, Emergence and Pandemic Potential of Nipah Virus in Bangladesh</b>	
PERFORMANCE REPORT - SHORT FORM	
<b>PART I: Award Information</b> (to be completed by Prime)	
<b>1. Name of Awarding Entity:</b> NIH-Fogarty International Center	
<b>2. Award Number:</b> 2R01-TW005869	
<b>3. Award Type:</b> Grant	
<b>4a. Award Value (or subagreement value):</b> (b)(4)	
<b>4b. Annual amount received for each of last 3 years:</b> (b)(4)	
<b>4c. Award beginning and end dates:</b> 08/01/08-06/30/14	
<b>5. Problems:</b> (if problems encountered on this award, explain corrective action taken): No significant problems encountered	
<b>6. Contacts:</b> (Name, Address, Telephone Number and E-mail address)	
<b>6a. Agreement Officer:</b> (b)(6) @nih.gov, Phone: (b)(6)	(b)(6)
<b>6b. Technical Officer (AOTR/COTR):</b> (b)(6) @nih.gov, Phone: (b)(6)	
<b>6c. Other:</b> N/A	
<b>7. Recipient:</b> EcoHealth Alliance	
<b>8. Title/Brief Description of Product/Service Provided:</b> 'The Ecology, Emergence and Pandemic Potential of Nipah Virus in Bangladesh'/Nipah virus is an emerging zoonotic virus carried by old world fruit bats that causes regular outbreaks of encephalitis with high mortality rates in people Bangladesh. This five-year program aims to study the dynamics of Nipah virus in its natural bat reservoir, as well as the spillover dynamics among bats, other animals, and people, in an effort to understand the risk of Nipah virus causing a global pandemic.	
<b>9. Information Provided in Response to RFA/RFP No.:</b> USAID-RDMA-RFA-486-13-0000001 Land Use Change and Disease Emergence Program	
<b>10. Key project accomplishment and results to date:</b>	
<ul style="list-style-type: none"> <li>▪ Multidisciplinary collaboration set up among veterinarians, epidemiologists, physicians, anthropologists, ecologists and virologists at EcoHealth Alliance and ICDDR,B</li> <li>▪ Thousands of bats sampled across Bangladesh</li> <li>▪ Systematic study of viral and antibody prevalence in populations across Bangladesh.</li> <li>▪ Large-scale case-control study of people in villages across Bangladesh to characterize environmental and behavioral risk factors associated with human spillover.</li> <li>▪ Identified over 10 clusters of Nipah virus infection in people in Bangladesh</li> <li>▪ Published over 25 papers in high profile scientific journals</li> </ul>	



**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE

Infectious Disease Emergence and Economics of Altered  
Landscapes

# Quarterly Report

Year 1 Quarter 1 – October 15, 2013 to January 14, 2014

Submission Date: February 21, 2014

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)



Submitted by: Peter Daszak, Chief of Party  
EcoHealth Alliance  
460 W. 34<sup>th</sup> St., 17<sup>th</sup> Fl., NY, NY 10001  
Tel: 212-380-4460  
Email: [daszak@ecohealthalliance.org](mailto:daszak@ecohealthalliance.org)

USAID-00911

This document was produced for review by the United States Agency for International Development

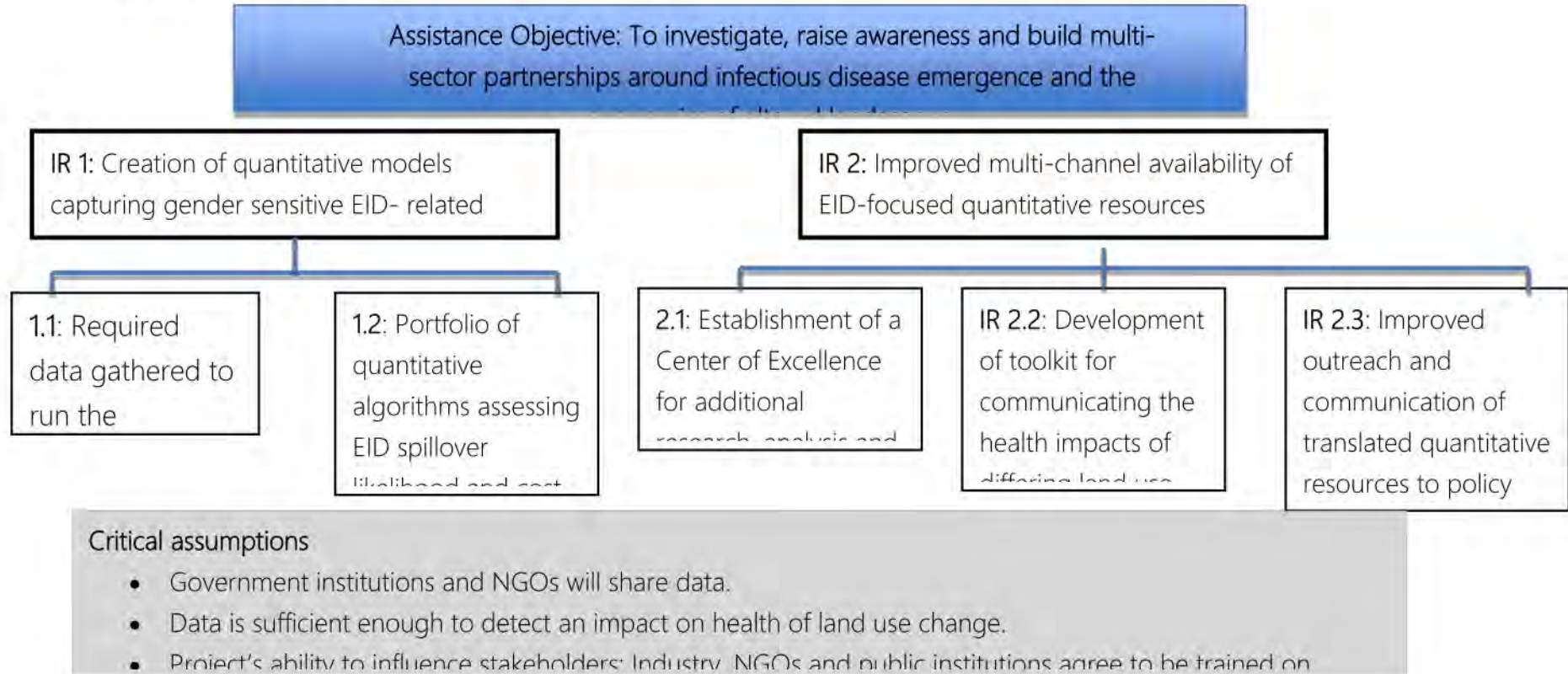


## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	Oct. 15, 2013 – Jan. 14, 2014

## 1.1 Program Description/Introduction

### RESULTS FRAMEWORK



Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife

Department (SWD), the Universiti Malaysia Sabah School of Business and Economics, and other governmental and non-governmental stakeholders, EHA is: (1) developing a functional, field-trialed, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; (2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; (3) building alliances amongst a diverse range of stakeholders; (4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and (5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A center of excellence for economic analysis of land-use change and health outcomes will be developed. The Center for Development and Health (CDH) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the School of Business and Economics at the Universiti Malaysia Sabah (UMS). The CDH will be a forum for a state-of-the-art multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, agriculture, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, and the CDH will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

At the end of the project period, EHA and project partners will have produced four main deliverables that satisfy the proposed IRs. They are: 1) quantitative models of land-use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision making and that can be generalized or modified for other applications 2) the Center for Development and Health (CDH) at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and CDH
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

Standard Indicators	Baseline FY 2013	Annual Target	Q1 FY13	Annual Performance Achieved to the End of Reporting Period (%)	On Target Y/N
Datasets acquired for analysis and modeling: - Deep Forest Human Contact surveys					Y
Datasets acquired for analysis and modeling: - Obtain new disease data differentiated by gender					Y
Effectiveness of the Center of Excellence and Health (CDH) - Identify key staff, programs, outreach strategies, strategic objectives, partnerships with international academic institutions					Y
Effectiveness of the Center of Excellence and Health (CDH) - Select local or regional graduate students for involvement					Y
Effectiveness of the Center of Excellence and Health (CDH) - Identify industry and civil society stakeholders for participation in the CDH with help from UMS and SWD					Y
Effectiveness of the Center of Excellence and Health (CDH) - Establish regular meetings, including roundtables at the CDH for stakeholders for public dissemination of materials and information					Y



## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

EcoHealth Alliance have met with Ministry of Health, Department of Veterinary Services, Department of Wildlife and National Parks Peninsular Malaysia, Sabah Wildlife Department (SWD), Danau Girang Field Centre (DGFC), Department of State Health Sabah and the Universiti Malaysia Sabah (UMS) School of Business and Economics to discuss the aims and timeline for the IDEEAL project and the importance of getting stakeholders from government, industry and nonprofit sectors involved from the start of this project.

EcoHealth Alliance, with assistance from SWD, DGFC and UMS have identified a group of 39 organizations to attend initial meetings planned for the Y1Q2.

The invited organizations are as follows:

Sabah Wildlife Department; Danau Girang Field Centre; Universiti Malaysia Sabah - Deputy Vice Chancellor; Universiti Malaysia Sabah - School of Business and Economics; Universiti Malaysia Sabah - School of Medicine; Universiti Malaysia Sabah - Institute for Tropical Biology and Conservation; Sabah Biodiversity Council; Ministry of Tourism, Culture and Environment; Malaysian Palm Oil Council; Malaysian Palm Oil Board; Malaysian Palm Oil Association; SEDIA (Sabah Economic and Development Investment Authority); Ministry of Agriculture and Food Industry; Ministry of Rural Development; Land and Survey Department; Sabah Economic Planning Unit; Natural Resource Office of Sabah; Ministry of Plantation, Industries and Commodity; Sabah Forestry Department; Yayasan Sabah (Sabah Foundation); Sime Darby; PepsiCo; Chevron; Coca Cola; Cargill; Johnson & Johnson; Colgate-Palmolive; Department of Wildlife and National Parks Peninsular Malaysia; Department of Veterinary Services; Ministry of Health; Department of State Health Sabah; Forest Research Institute Malaysia; Forestry Department Peninsular Malaysia; United Nations Development Programme; Ministry of Natural Resources and the Environment; Global Environment Centre; LEAP (Land Empowerment Animals People); HUTAN; Nicola Abram Kent University; and WWF.

EcoHealth Alliance and SWD have discussed in detail the need to emphasize to all stakeholders, especially industry and policy makers, that the project is seeking solutions that are business friendly, and beneficial to health and the environment. With that in mind two meetings are planned in Q2. The first meeting will be with policy makers in Sabah that EHA have not worked with in the past. The idea of this meeting will be to introduce EHA and to hear the policy makers' concerns related to the future of land-use change for commercial products and development in a completely confidential setting. The second meeting will be a larger workshop with all of the above mentioned

participants to hear the different stakeholders' (NGOs, Government and Industry) views on the issues surrounding land-use change and health, and hear their ideas for solutions that are pro-business.

EcoHealth Alliance has scheduled a meeting in Q2 with the Deputy Vice Chancellor and Dean from the school of Business and Economics at UMS to discuss the CDH

## 2.2 Implementation Status

- Identified core management staff.
  - [redacted] of the Center for Development and Health (CDH).
  - [redacted] for the CDH.
  - Borneo Conservation Initiative established as local investigator for the DFHC survey work.
  - [redacted] established as [redacted] for Sabah Wildlife Department activities.

- Secured core administration staff.
- Revised project indicators.
- Drafted, revised and submitted Work Plan.
- Drafted and submitted Monitoring and Evaluation Plan.
- Identified stakeholders and hosted first roundtable meeting.
- Began preliminary analysis of Deep Forest data that will be used in ecological models including ranked abundance curves and species accumulation curves to assess sampling effort at each of our sites to determine the amount of effort required (in nights) to detect any arbitrary proportion of the estimated asymptotic species richness.
- Established timeline for DFHC survey work in Sabah. Data will be available for use by July 2014.
- In the process of identifying graduate students to do theses focusing on the issues this project will address.
- Invited Senior Staff from School of Business and Economics, School of Medicine, and Institute for Tropical Biology and Conservation at Universiti Malaysia Sabah to attend workshop.



## 2.3 Implementation challenges

- None to report.

## 2.4 M&E Update

- M&E Plan submitted; comments and inquiries under revision; to be re-submitted in Q2.

## 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

### 3.1 Gender Equality and Female Empowerment

- [REDACTED] proposed as the [REDACTED] Center for Development and Health and in position to foster women's participation and leadership in environment and health issues.

### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- EcoHealth Alliance, with assistance from SWD, DGFC and UMS have identified 39 organizations to attend initial meetings planned for the Y1Q2.

## 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- CoP and DCoP met with members of Universiti Malaysia Sabah School of Business and Economics to discuss details of establishing the Center for Development and Health. Follow up discussions were planned for Q2 with Deputy Vice Chancellor and the Dean of the School of Business and Economics.
- Identification of 39 partner institutions to attend Q2 roundtable to be held in Kota Kinabalu.

## 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- [REDACTED] selected to support DCoP in Y1 of project.

## 6. COMMUNICATIONS

- Met with Ministry of Health, Department of Veterinary Services, Department of Wildlife and National Parks Peninsular Malaysia, Sabah Wildlife Department

(SWD), Danau Girang Field Centre (DGFC), Department of State Health Sabah and the Universiti Malaysia Sabah (UMS) School of Business and Economics to discuss the aims and timeline for the IDEEAL project and the importance of getting stakeholders from government, industry and nonprofit sectors involved from the start of this project.

- IDEEAL team, with assistance from SWD, DGFC and UMS identified a group of 39 organizations to attend initial meetings planned for the Y1Q2
- Met with organizations with which EHA has had prior relationships, and explained aims and timeline of IDEEAL.
- For new organizations, DCoP will meet with Malaysian Palm Oil Council, Sime Darby Foundation and Sime Darby Plantations in Q2.

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### **Project Management and Start-up**

- Will perform a semi-annual review of program activities and progress.

### **1.1 Required data gathered to run quantitative model**

- Will meet with relevant partners and begin to identify data availability.
- Will begin to obtain available temporal, geospatial data of land-use/land-cover and disease data.
- Will begin to obtain available economic parameter data.
- Will continue to obtain new data, including DEEP FOREST Human Contact Survey data and disease data.

### **1.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed**

- Will commence work to determine rates of land-use/land cover change under 3 different scenarios - Business as Usual (BAU), increased land-use change, and halted land-use change.

### **2.1 Establishment of a Center for Excellence for additional research, analysis, and cross disciplinary partners**

- Will continue working to establish the Center for Development and Health.



- Will host a quarterly roundtable at UMS for stakeholders to introduce the project and get feedback from participants about needs, challenges, and goals pertaining to their organization's land altering activities. At the conclusion of the meeting, action items will be detailed and the next stakeholder meeting will be planned.
- Will continue to identify stakeholders for participation in the CDH with assistance and guidance from UMS and SWD.

## 8. Communication and outreach strategy

The effectiveness of the project will strongly depend on EHA's ability to demonstrate IDEEAL's relevance, technical credentials, successes and long-term benefits to the various target audiences using practical approaches and simplified language. Through targeted marketing and communication techniques the trust of EHA's new and existing project stakeholders will be built. This communication plan will serve as a roadmap throughout the project, ensuring that the project's communication efforts are efficient, effective and sustainable. In the long run, a properly executed communication plan advances EHA's mission, widens its program reach and improves future funding prospects.

EHA will facilitate communication with USAID and among partners, through in-person meetings, conference calls, written advisories, and timely compliance with all reporting.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA))

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DOSHS), Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## **8.2 Messages**

### **1 - US Government officials:**

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### **2 - Ministries and institutional decision-makers:**

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### **3 - Private partners and industry stakeholders:**

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth*

### **8.3 Milestones**

October 2013: Held an initial informational meeting to understand stakeholder landscape, identify interested parties and discuss project deliverables.

December 2013: 1<sup>st</sup> Roundtable - Project Chief of Party and Deputy Chief of Party meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

January 2014: Creating a brand identity for the project

- Planning of community awareness / project promotion campaign
- Creating a webpage for the project on the EHA website.

February 2014: - Stakeholder introductory workshop; Stakeholders will be identified, briefed on project goals and invited to participate and give input and we will evaluate their attitudes and awareness around land use issues; Stakeholders will identify their areas of expertise and potential resources they could contribute to the project

- Establish regular meetings, including quarterly roundtables at the CDH for stakeholders for public dissemination of materials and information

July 2014: 2<sup>nd</sup> Roundtable - Dialogue with policy makers and key industry partners to discuss the relevance of EID threats to certain policies and programs

September 2014: 4<sup>th</sup> Roundtable - Evaluate results of communication strategy for Year 1 using community surveys, analysis of social media, etc.

## ANNEX A: PROGRESS SUMMARY

- We identified core management and administrative staff.
- We have formulated a communications and outreach strategy
- We began preliminary analysis of Deep Forest data that will be used in ecological models including ranked abundance curves and species accumulation curves to assess sampling effort at each of our sites to determine the amount of effort required (in nights) to detect any arbitrary proportion of the estimated asymptotic species richness).
- EcoHealth Alliance, with assistance from SWD, DGFC and UMS have identified a group of 39 organizations to attend initial meetings planned for the Y1Q2
- EcoHealth Alliance and SWD have discussed in detail the need to emphasize to all stakeholders, especially industry and policy makers, that the project is seeking solutions that are business friendly, and beneficial to health and the environment.
- We are in the process of identifying graduate students to do theses focusing on the issues this project will address.
- We invited Senior Staff from School of Business and Economics, School of Medicine, and Institute for Tropical Biology and Conservation at Universiti Malaysia Sabah to attend workshop





**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE

Infectious Disease Emergence and Economics of Altered  
Landscapes

## Quarterly Report

Year 1 Quarter 2 – January 15, 2014 to April 14, 2014

Submission Date: April 22, 2014

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)



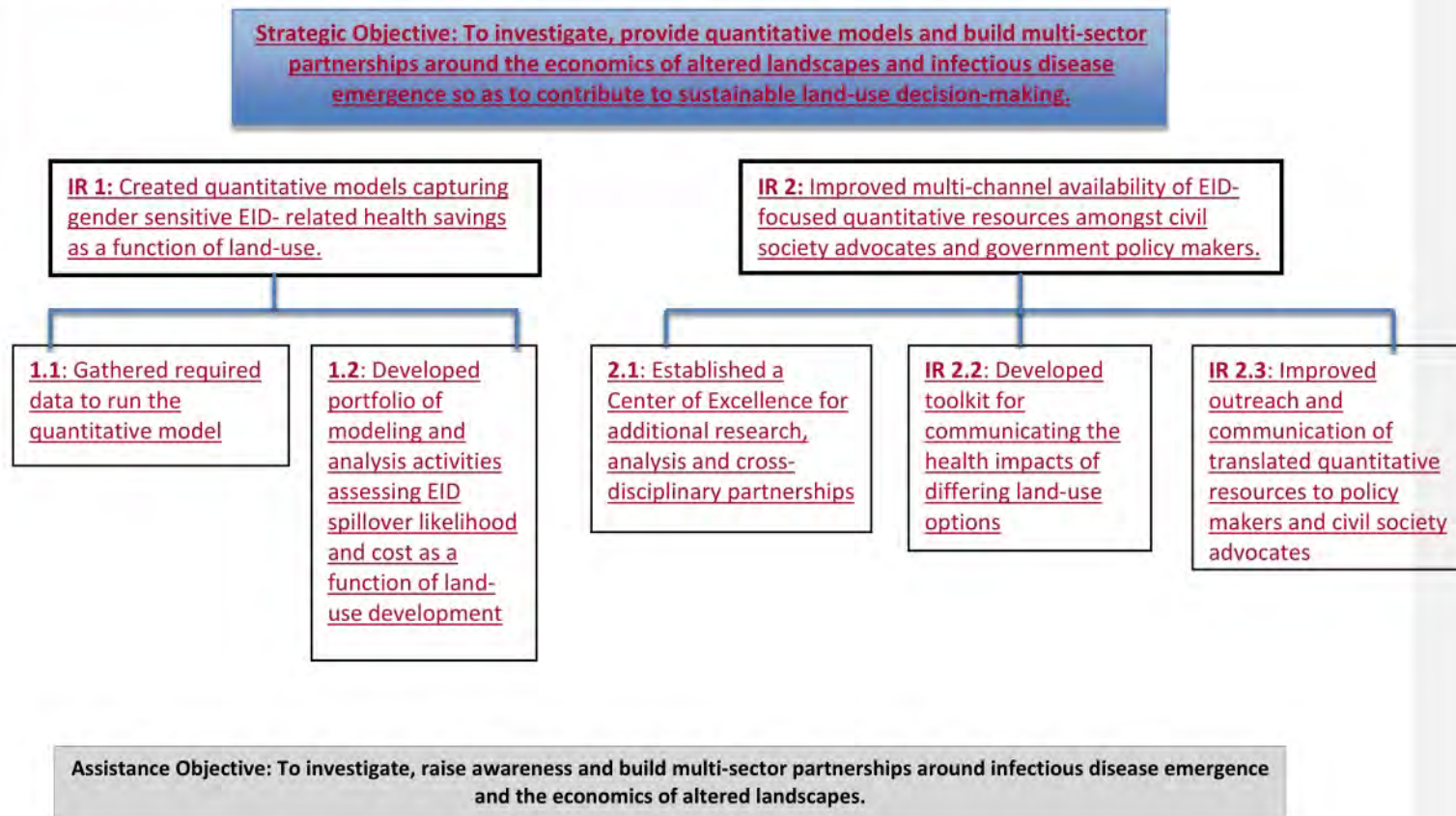
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I PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 – October 14 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	Jan. 15, 2014 – Apr. 14, 2014

## Results framework



## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah School of Business and Economics, and other governmental and non-governmental stakeholders, EHA is: (1) developing a functional, field-trialed, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; (2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; (3) building alliances amongst a diverse range of stakeholders; (4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and (5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A center of excellence for economic analysis of land-use change and health outcomes will be developed. The Center for Development and Health (CDH) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the School of Business and Economics at the Universiti Malaysia Sabah (UMS). The CDH will be a forum for a state-of-the-art multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, agriculture, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, and the CDH will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

At the end of the project period, EHA and project partners will have produced four main deliverables that satisfy the proposed IRs. They are: 1) quantitative models of land-use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision making and that can be generalized or modified for other applications 2) the Center for Development and Health (CDH) at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and CDH



- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

(b)(4)	Standard Indicators	Baseline FY 2014	Annual Target	Q2 FY14	Annual Performance Achieved to the End of Reporting Period (%)	On Target Y/N
	Meet with relevant partners to identify data availability				(b)(4)	Y
	Obtain available temporal, geospatial data of land use/land cover and disease data					Y
	Obtain available economic parameter/indicator data					Y
	Identify and obtain data to correct for reporting bias					Y
	Obtain new data, including DEEP FOREST human contact and disease data					Y

(b)(5); (b)(5) -  
Deliberative  
Process Privilege

(b)(4)

Ensure gender-specified data is included in above activities		(b)(4)	Y
Determine rates of land-use/land cover change under 3 different scenarios - Business as Usual (BAU), Increased land-use change, halted land-use change			Y
Effectiveness of the Center of Development and Health (CDH) with UMS (i.e. decide key staff, programs, outreach strategies, strategic objectives, partnerships with international academic institutions, etc.)			Y
Select local or regional graduate students for involvement			Y

(b)(4)

Identify stakeholders for participation in the CDH with help from UMS and SWD		(b)(4)	Y
Conduct survey of differential gendered disease risk exposure pathways to inform toolkit development and dissemination strategies			Y
Establish regular meetings, including quarterly roundtables at the CDH for stakeholders' engagement in design and production of outreach materials			Y
Evaluate stakeholder awareness of issues of land use change, risk of disease emergence, and gender implications			Y



## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

26<sup>th</sup> February EcoHealth Alliance met with (b)(6).  
(b)(6)  
(b)(6) Agreed to create Centre for Development and Health at UMS. Centre will be located at the School of Medicine.

26<sup>th</sup> February EcoHealth Alliance met with Sabah Wildlife Department, SEDIA (Sabah Economic and Development Investment Authority), Ministry of Agriculture and Food Industry, Ministry of Rural Development, Sabah Forestry Department, and Land and Survey Department at SWD to introduce EHA to government partners, to introduce the IDEEAL project while emphasizing that the project is looking for pro business solutions to land use change and its impact on health.

27<sup>th</sup> February First round table meeting held at SBE at UMS. 36 participants attended meeting from following organizations: WWF, Forest Research Institute Malaysia, Institute for Tropical Biodiversity and Conservation UMS, USAID, PERHILITAN, DGFC, Borneo Conservation Initiative, HUTAN, SWD, Sabah Forestry Department, School of Business and Economics UMS, School of Medicine UMS, Land Registry Department, and LEAP.

Have met with District Officer, District Health Officers, Representative from the Native Court and Village Heads to discuss Human Survey around Kinabatangan near PREDICT sites. All have given their full support for Human Survey.

Human Survey has been approved by Malaysian National Institute of Health and is awaiting final approval by Malaysian Ethical Review Committee which is being expedited. Community meeting to be held 24/4/14; 400 surveys will be completed by end of May.

Have conducted recce of Oil Palm plantations near PREDICT DF sites. In the process of finalizing list of palm oil plantations to be targeted for survey.

Have created a draft of MOU with UMS. Assisting (b)(6) with writing Senate Paper. Paper will be presented to UMS Senate in May. Once Senate approves collaboration MOU will be finalized.

(b)(6) believes she has identified one individual finishing his Masters' degree who would like his PhD to be focused on the IDEEAL project. Will provide details to DCoP.

(b)(5); (b)(5) -  
Deliberative  
Process Privilege

DCoP has scheduled meetings with Malaysian Palm Oil Council and Sime Darby for early in next quarter to discuss industry involvement.

DCoP met with (b)(6) to discuss Senate paper, MOU and CDH.

DCoP met with (b)(6) who was unable to attend roundtable meeting. (b)(6) has voiced her strong support for the project and will provide details of 10 plantations which already actively assist DSHS in Disease Surveillance. (b)(6) feels these plantations will be very keen to be directly involved in IDEEAL work.

Other schools and Centres at UMS have shown an interest in IDEEAL. A meeting was held at UMS with School of Medicine, School of International Tropical Forestry, School of Social Science, Biology Tropical and Conservation Institute and Ethnography Research and Development Unit to discuss who will be involved and the different visions for the CDH.

DCoP will follow-up with (b)(6) to discuss minor issues raised in this meeting, and early in next quarter will meet with interested schools and units from UMS that did not attend first round table meeting.

(b)(5); (b)(5) -  
Deliberative  
Process Privilege

## 2.2 Implementation Status

- Identified disease and economic data necessary to run the models
- Met with relevant partners to identify data availability. Received strong, positive indications that partners are willing to share data for IDEEAL. Have started to discuss the data needed and the available data sets with SWD, UMS and DSHS.
- In the process of identifying which agencies in Sabah and Malaysia have the best data on land use and land use cover. DSHS will provide disease data in next quarter. DCoP to discuss further with MOH in Q3 what additional data is available.
- In the process of identifying which agencies in Sabah and Malaysia have the economic data needed. All data required on the cost of disease for Sabah may not be available but students at SBE UMS are beginning to compile data on cost of disease.
- Began to obtain available temporal, geospatial data of land-use/land-cover and disease data. Met with (b)(6) (Dept. of Geographical Sciences - University of Maryland) to access a temporal (2000 - 2013), high-resolution (30

m) dataset of global land-use change. Additionally, discussed the feasibility to expand the temporal dataset to include 1990 to 2000 just for Sabah. Began the design of web crawlers to get data on disease outbreaks in the study region. This list of outbreaks will be used to inform and prioritize data acquisition.

- Began literature review on economic data for the region and began preliminary review of the Malaysian Department of Statistics.
- Began preliminary analysis of Deep Forest data that will be used in ecological models, including ranked abundance curves and species accumulation curves to assess sampling effort at each of our sites to determine the amount of effort required (in nights) to detect any arbitrary proportion of the estimated asymptotic species richness.
- Economic modeler developed theoretical model; working to parameterize this with available data from a tropical forest region.
- Administered baseline survey to stakeholders at the roundtable.
- Completed data entry for baseline survey.
- Began preliminary analysis showing baseline knowledge among different stakeholders.

## 2.3 Implementation challenges

- No private Industry partners attended February's roundtable. Sime Darby plantations have voiced their interest in IDEEAL project and DCoP will meet with them early in next quarter. DSHS will provide details of 10 plantations that assist the DSHS with disease surveillance who, (b)(6) believes, will be interested in taking active role in IDEEAL.
- Centre of Development Health will start as a Unit under the School of Business and Economics. A Unit at UMS does not have to generate its own funds, it needs to create a network of cooperation and develop positive changes in its field of focus. After first year, it will become a Centre within UMS. To be a Centre it will need 3 UMS academic staff as part of the Centre, it will have to generate its own funds through grants or consultancy and have identified a niche area to develop. There is a chance the Vice Chancellor will allow us to skip the Unit stage, but this is going to require further discussion. While funding to support CDH is limited, a Unit under the SBE may be the best way to proceed.
- UMS has suggested a name change to Development and Health Research Unit.
- Dean at SBE is a rotating position. (b)(6) has been replaced by (b)(6). DCoP met with (b)(6) who is very receptive and excited by the project.



- Data acquisition: Most of the economic information from the Department of Statistics is not available in digital format.

## 2.4 M&E Update

- M&E Plan reviewed and resubmitted.

## 3 INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

### 3.1 Gender Equality and Female Empowerment

- (b)(6) Center for Development and Health and in a position to foster women's participation and leadership in environment and health issues.
- Equal male/female participation at the February roundtable.
- BCI staff are all female and they work with local communities to improve female empowerment.

### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- Sime Darby have voiced interest in IDEEAL project. DCoP has scheduled meetings with them in Q3.

## 4 STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Roundtable held in Kota Kinabalu with 36 participants from following organizations – WWF, Forest Research Institute Malaysia, Institute for Tropical Biodiversity and Conservation UMS, USAID, PERHILITAN, DGFC, Borneo Conservation Initiative, HUTAN, SWD, Sabah Forestry Department, School of Business and Economics UMS, School of Medicine UMS, Land registry Department, and LEAP
- Stakeholders will provide the following resources to CDH:
- Forestry: statistics on forestry; Forest Research Center in Sandakan collecting primary data; local biologists and researchers at lower Kinabatangan
- WWF: land use change data
- HUTAN: field assistants to collect data; network of scientists who are working on similar issues; resource- sharing



- BCI: local ecological and traditional knowledge, without political alignment
- SEPA: EIA reports; knowledge; networks
- EHA: share lessons and experiences from previous collaborations; finding and sharing funding opportunities; networking externally; sample sharing; training and protocol sharing; mentoring for graduate students; assistance in journal publications; data on emerging diseases and the environmental drivers; analytical/modeling approaches; fundraising skills
- LEAP: networking
- Business School: physical structure (campus); students; channel for implementations; sustainable business studies that can be shared
- USAID: contribute on the publicity and outreach initiatives to the global level with the project outcomes; help develop networks with project-relevant linkages; advocate for connected environment at intersection of environment and health; leveraging public and private partnership resources
- FRIM: social sciences, zoology, forest management/planning and climate change experts; research centers; forestry publications; contacts at national and international levels; various databases e.g. ethnobotanic/traditional knowledge from Malays and Orang Asli; equipped labs; consultancy services
- PERHILITAN: existing Wildlife Genetics lab for potential collaborations with CDH, [new genetics/research lab, newly developed Wildlife Disease Surveillance Programme]; annual inventory of flora and fauna where EID surveillance can be integrated; Centre - Institute for Biodiversity as a training and collaboration centre, bridging capabilities with the Ministry of Natural Resources and Environment for policy-making processes
- School of Medicine: physical structures - labs, clinics in KK and Sandakan for infrastructure development; TB Research Unit in Kudat; Rural Health Unit in Kudat; human resources - clinicians, students
- Business School students: human resources -> data collector, analyzing data, local knowledge, info disseminator, tool for outreach programmes
- DGFC: sharing (GIS) data with students, experts
- SWD: source and data collector from the field; bring public awareness to the field
- All roundtable participants completed baseline attitudes and awareness surveys

## 5 MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

## 6 COMMUNICATIONS

- Met individually with Ministry of Health, Department of Veterinary Services, Department of Wildlife and National Parks Peninsular Malaysia, and collectively with Sabah Wildlife Department (SWD), Danau Girang Field Centre (DGFC), Department of State Health Sabah and the Universiti Malaysia Sabah (UMS) School of Business and Economics and School of Medicine explained aims and timeline of IDEEAL. DCoP had repeated communication with point of contact at UMS for CDH (b)(6) to establish formal agreement to host the CDH.
- CoP, DCoP, Policy Lead and Stakeholder Lead met with Vice Chancellor and faculty at UMS School of Business and Economics and School of Medicine. Received pledge of support from Vice Chancellor for hosting CDH at UMS. Reviewed spaces on campus where future CDH meetings could be held. Follow up with formal proposal for MOU with UMS and proposal for CDH.

## 7 PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### Project Management and Start-up

#### 7.1 Required data gathered to run quantitative model

- Will continue to identify data from partners
- Will continue to obtain available temporal, geospatial data of land-use/land-cover and disease data.
- Will continue to obtain available economic parameter data.
- Will continue to obtain new data, including DEEP FOREST Human Contact Survey data and disease data.
- Will begin Quality Control/Quality Assurance on the obtained data

#### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Will commence work to generate land-use change scenarios: - Business as Usual (BAU), increased land-use change, and halted land-use change.

- Will begin to determine the value of damages from past EID events.
- Will begin work on a model to predict expected damages of future disease events.
- Explore the use of expected damages function to predict damages under deforestation scenarios.

#### 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue working to establish the Center for Development and Health.
- Will host a quarterly roundtable at UMS for stakeholders to introduce the project and get feedback from participants about needs, challenges, and goals pertaining to their organization's land altering activities. At the conclusion of the meeting, action items will be detailed and the next stakeholder meeting will be planned.
- Will continue to identify stakeholders for participation in the CDH with assistance and guidance from UMS and SWD.

#### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Will survey other stakeholders/community members for baseline attitudes and awareness

### 8. COMMUNICATION AND OUTREACH STRATEGY

The effectiveness of the project will strongly depend on EHA's ability to demonstrate IDEEAL's relevance, technical credentials, successes and long-term benefits to the various target audiences using practical approaches and simplified language. Through targeted marketing and communication techniques the trust of EHA's new and existing project stakeholders will be built. This communication plan will serve as a roadmap throughout the project, ensuring that the project's communication efforts are efficient, effective and sustainable. In the long-run, a properly executed communication plan advances EHA's mission, widens its program reach and improves future funding prospects.

EHA will facilitate communication with USAID and among partners, through in-person meetings, conference calls, written advisories, and timely compliance with all reporting.

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## 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, Industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DOSHS), Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:



*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

October 2013: Held an initial informational meeting to understand stakeholder landscape, identify interested parties and discuss project deliverables.

December 2013: 1<sup>st</sup> Roundtable - Project Chief of Party and Deputy Chief of Party meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

January 2014: Creating a brand identity for the project

- Planning of community awareness / project promotion campaign

February 2014: Stakeholder introductory workshop; stakeholders were identified, briefed on project goals. A survey to evaluate their attitudes and awareness around land-use issues and its link to disease risk was performed. Stakeholders identified their areas of expertise and potential resources they could contribute to the project.

- Planning of regular meetings was discussed, including quarterly roundtables at the CDH for stakeholders for public dissemination of materials and information.

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact survey initiated.

- Preliminary data analysis on baseline knowledge among stakeholders.

July 2014: 2<sup>nd</sup> Roundtable - Dialogue with policy makers and key industry partners to discuss the relevance of EID threats to certain policies and programs

September 2014: 4<sup>th</sup>-3<sup>rd</sup> Roundtable - Evaluate results of communication strategy for Year 1 using community surveys, analysis of social media, etc.



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Infectious Disease Emergence and Economics of Altered Landscapes

## Quarterly Report

Year 1 Quarter 3 – April 15, 2014 to July 14, 2014

## List of Acronyms

BCI	Borneo Conservation Initiative
CoE	Center of Excellence
CoP	Chief of Party
DCoP	Deputy Chief of Party
DFHC	DEEP FOREST Human Contact
DHRU	Development and Health Research Unit
DSHS	Department of State Health Sabah
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EPT	Emerging Pandemic Threats
KL	Kuala Lumpur
LEAF	Lowering Emissions in Asia's Forests
M&E	Monitoring and Evaluation
MPOC	Malaysian Palm Oil Council
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
OCA	Organizational Capacity Assessment
PERHILITAN	Department of Wildlife and National Parks (Malaysia)
RDMA	Regional Development Mission for Asia (of USAID)
RFA	Request for Applications
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SWD	Sabah Wildlife Department
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
WHO	World Health Organization
WWF	World Wide Fund for Nature



## I. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	April 15, 2014 – July 14, 2014

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). It will include staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and CDH
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

(b)(4)	Standard Indicators	Baseline FY 2013	Annual Target	Q3 FY14	Annual Performance Achieved to the End of Reporting Period (%)	On Target Y/N
	Number of dataset acquired, cleaned and formatted				(b)(4)	Y
	Number of models run to determine the economic cost linking spillover risk costs with land conversion costs					Y
	Center of Excellence established and functional					Y
	Strategic sustainability business plan for the Center of Excellence developed and operationalized					Y

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## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- EHA economists met in Malaysia on May 18-23, 2014:
  - Worked on model and prepared for July meetings in Sabah
  - Discussed state-level data needed to refine model
  - Re-worked and detailed “data needs” list, to better communicate economic variables intended for non-economists (public outreach; civil society stakeholders)
  - Reviewed the model mechanics with the broader IDEEAL team, discussed potential issues and application to Sabah
- DCOP communicated with stakeholders and organized a stakeholder meeting at CDH for July with COP and modeling lead.
- Meetings with Vice Chancellor and Faculty of UMS set up for July with COP, DCOP and modeling team to finalize MOU and discuss CDH that will begin as a Development and Health Research Unit (DHRU) within the School of Business and Economics.
- 27<sup>th</sup> April, DCoP met with (b)(6) to continue to work on the draft of the Senate Paper for approval by UMS Senate for the creation of the DHRU.
- 30<sup>th</sup> April, Stakeholder Meeting at the Kota Kinabatangan District Office to discuss conducting Human Animal Contact Survey and IDEEAL Base Line Survey. In attendance were the Assistant District Officer, Village Heads, Oil Palm Plantation managers (IOI, Sawit Kinabalu, Genting) District Health Officer, Sabah Wildlife Department (SWD), representative from the Native Court, Borneo Conservation Initiative (BCI), DCoP and EHA staff. Introduced project to all stakeholders, all participants completed the IDEEAL Base Line Survey, provided background on PREDICT, Deep Forest and IDEEAL; answered questions and concerns and received permission from District Office to collect data from communities. District Office issued a letter for distribution to the community concerning the village level meeting and stating its support for the study. Village level meeting would be conducted on 1<sup>st</sup> May for Kampung Bilit and 2<sup>nd</sup> May for Kampung Sukau. Both Kampung representatives agreed on dates.
- 1<sup>st</sup> May, Malaysian Ethical Review Committee approved Human Animal Contact Survey.
- 1<sup>st</sup> May, Community level meeting at Kampong Bilit to explain the work of the Wildlife Health Unit, the aims of the PREDICT, Deep Forest and IDEEAL projects and to gauge the level of support we could expect from the community for responding to the Human Animal Contact Survey and IDEEAL Base Line Survey.

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- 2<sup>nd</sup> May, Community level meeting at Kampong Sukau to explain the work of the Wildlife Health Unit, the aims of the PREDICT, Deep Forest and IDEEAL projects and to gauge the level of support we could expect from the community Human Animal Contact Survey and IDEEAL Base Line Survey.
- 15<sup>th</sup> May, Human Animal Contact Survey gets IRB Approval from UC Davis.
- 15<sup>th</sup> May - 5<sup>th</sup> June, 406 Deep Forest Human Contact (DFHC) Surveys and 422 IDEEAL Baseline Surveys (16 IBS conducted at DO meeting) completed across the anthropogenic disturbance gradient at Gomantong Forest Reserve (Pristine), Oil Palm Plantations (disturbed) and the villages of Sukau and Bilit (semi-disturbed).
- 16<sup>th</sup> June, DCoP meets with (b)(6) to discuss the IDEEAL project, he expresses great interest in the project and promises to assist with acquiring data and making introductions to other industry players and raises the possibility of providing additional funding for Malaysian students to do a Masters' or PhD at Development and Health Research Unit.
- 2<sup>nd</sup> July, DCoP party met with the Head In Charge of Plantation Sustainability & Quality Management at Sime Darby and the Chief Executive Officer and the Head of Projects for Yayasan Sime Darby (their CSR division). Discussed PREDICT, Zoonosis and IDEEAL. They were unable to attend the next stakeholder meeting planned for 16<sup>th</sup> July 2014, but were interested in the project. They have agreed to provide us with data from the various conservation projects they support - SAFE, the NESTLE Relief Project and their Reforestation program all being good examples but will want to learn more about the model before taking the project to senior management and requesting access to their industry data. A meeting with the conservation projects they support is planned for later in the year as well as a meeting to discuss the IDEEAL model in more detail once it is more developed.
- 7<sup>th</sup> July CoP and DCoP met with the new (b)(6) to discuss the IDEEAL project. (b)(6) agrees to attend next IDEEAL stakeholder meeting planned for 16<sup>th</sup> July 2014.
- 8<sup>th</sup> July, CoP and DCoP met with (b)(6) to further discuss the IDEEAL project and the possibility of MPOC providing additional funding. DCoP invited to speak about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference 19-20<sup>th</sup> August.
- 8<sup>th</sup> July, CoP and DCoP met with (b)(6) to discuss the IDEEAL project.
- 14<sup>th</sup> July, DCoP, Senior Modeler and Economic Modeler met with (b)(6) (partnered with HUTAN) to discuss available data sets that could be used for the

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IDEEAL model and how the Spaces project and IDEEAL project could benefit each other. (b)(5) has spent a lot of time building the necessary relationships in various Sabah government depts. to secure data, and seems prepared to share these contacts with us.

- Regular communication with UMS regarding the DHRU, Senate paper, MOU and the next stakeholder meeting.

## 2.2 Implementation Status

- Ongoing modeling meetings at EHA and further developed model structure and identified data sets needed in advance of Sabah stakeholder meeting at CDH in July.
- Continue literature review on economic data, land use cover for the region.
- Piloted the economic model using epidemiological, ecological and cost data of Malaria in Brazil. This general model will be used as the framework to develop specific models for Sabah.
- Began data entry and translation of the Deep Forest Human Contact (DFHC) surveys.
- Selected questions relevant to IDEEAL from the DFHC survey pool for preliminary analysis.
- Revised and updated the list of datasets needed for modeling
- Modeling is on track for data acquisition and refinement in Q4 and Y2Q1.
- The economic model uses a flexible dynamic optimization framework that allows for consideration of varying economic and ecological assumptions. Several aspects of land use change dynamics were incorporated into the mathematical equations. For example:
  - Added option for timber harvest to occur on a plot of land as an economic benefit of land conversion.
  - Introduced investment in maintaining land productivity (fertilizer, erosion prevention) as potential costs to maintaining converted land.
  - Added forest regrowth after land abandonment (and potential replanting by managers). This scenario was included to describe more accurately natural processes.
- Preliminary simulations were run for the Brazilian Amazon. Models were parameterized with data from the Brazilian Amazon. This region is actively researched in terms of land use change and disease surveillance.
- Regional data included revenues and operation costs for industries using land in the region, ecosystem service values, annual land conversion rates, and total economic cost of a case of malaria. A literature review was conducted to gather this information.

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- Began sensitivity analysis using high and low estimates of ecosystem service values and health costs
- CDH development is moving forward, though delayed due to the need for a UMS Senate vote. UMS faculty are committed to participation and support of CDH, and graduate students will be identified and linked into IDEEAL project following July meeting in Q4 and Y2Q1.
- Met with relevant partners to identify data availability. Received strong, positive indications that partners are willing to share data for IDEEAL. Have started to discuss the data needed and the available data sets with SWD, UMS, DSHS, MOH, HUTAN, Living Landscape Alliance, and DVS.
- In the process of identifying which agencies in Sabah and Malaysia have the best data on land use and land use cover. DSHS will provide disease data in next quarter.
- In the process of identifying which agencies in Sabah and Malaysia have the economic data needed.

### 2.3 Implementation challenges

- Palm Oil Council has been engaged and interested in modeling. Although they were unable to attend Stakeholder meeting in Q2, they have been open to meetings and dialogue, and we anticipate a successful engagement with them as a major private industry stakeholder.
- DCoP met with Sime Darby and Yayasan Sime Darby and plans a second meeting in the next quarter to build on this new relationship. DSHS has not yet provided details of 10 plantations that assist the DSHS with disease surveillance who, (b)(6) believes, will be interested in taking active role in IDEEAL. DCoP is working on obtaining this information.
- Centre of Development Health will start as a Unit under the Faculty of Business and Economics. A Unit at UMS does not have to generate its own funds, it needs to create a network of cooperation and develop positive changes in its field of focus. To be a Centre it will need 3 UMS academic staff as part of the Centre, it will have to generate its own funds through grants or consultancy, and have identified a niche area to develop.
- UMS wants the name of CoE to be the Development and Health Research Unit (DHRU).
- DFHC surveys are in Malay and needed to be translated to English.
- Delays in launching the DHRU due to the need for a UMS Senate vote have delayed providing committed funds to students at UMS. A sub-contract will be sent to UMS in Y1Q4.

### 2.4 M&E Update

- M&E Plan reviewed and resubmitted.

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### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) proposed as (b)(6) of the DHRU (the future) Center for Development and Health) and in a position to foster women's participation and leadership in environment and health issues.
- Equal male/female participation planned for the July stakeholder meeting.
- Exploratory analysis of DFHC survey data has begun. This data will be disaggregated by gender and age to determine whether there are differential disease risks for women versus men.

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP is working to establish meetings with industry players through MPOC, US Embassy. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and Sabah state government agencies (Sabah CDC, MOH, Forestry Dept.) are engaged and have offered to supply outbreak and land cover data to IDEEAL modeling team.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- 30<sup>th</sup> April, Stakeholder Meeting at the Kota Kinabatangan District Office to discuss conducting Human Animal Contact Survey and IDEEAL Base Line Survey. In attendance were the Assistant District Officer, Village Heads, Oil Palm Plantation managers (IOI, Sawit Kinabalu, Genting) District Health Officer, SWD, representative from the Native Court, BCI, DCoP and EHA staff.
- 406 Human Animal Contact Surveys and 422 IDEEAL Baseline Surveys (16 IBS conducted at DO meeting) completed at Gomantong Forest Reserve, Oil Palm Plantations and the villages of Sukau and Bilit.
- Stakeholders invited to a meeting at CDH on July 18<sup>th</sup>. Participants included SWD, UMS, WWF, Hutan, Forestry Department, FRIM, and SEDIA. MPOC could not attend but invited DCoP to attend a Palm Oil conference in August to present IDEEAL project.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- Delays in launching DHRU at UMS due to the need for a UMS Senate vote have delayed subcontracting funds for UMS student support. A sub-contract will be sent to UMS in Y1Q4.

- Our economics assistant, (b)(6), left EHA. (b)(6) (b)(6) We are currently working on a replacement for her.

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## 6. COMMUNICATIONS

- Regular meetings and communication with Ministry of Health, Department of Veterinary Services, Department of Wildlife and National Parks Peninsular Malaysia, Sabah Wildlife Department (SWD), Danau Girang Field Centre (DGFC), Department of State Health Sabah and the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics about available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with point of contact at UMS for DHRU (b)(6) to establish formal agreement to host the DHRU.

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### Project Management and Start-up

#### 7.1 Required data gathered to run quantitative model

- Meeting with DVC at UMS 15<sup>th</sup> July to further discussions about DHRU and find out latest on Senate approval and meeting with senior staff from Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit to discuss plans and agree on road map for the DHRU.
- Meeting with CoP, DCoP and (b)(6) to discuss data sets and collaboration through PREDICT and IDEEAL projects.
- DCoP invited to speak at MPOC International Palm Oil Sustainability Conference 19-20<sup>th</sup> August.
- Will continue to identify data from partners
- Will continue to obtain available temporal, geospatial data of land-use/land-cover and disease data.
- Will continue to obtain available economic parameter data.
- Will begin parameterization of the model using local or regional data.

#### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Will develop conceptual framework to explore models for different diseases including emergent and re-emergent diseases
- Will begin literature review to estimate the cost of different ecosystem services in the region.

#### 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue working to establish the Development and Health Research Unit.
- Will host a quarterly roundtable at UMS for stakeholders to introduce the first version of the model and get feedback from participants about data sets they have and best source for required data
- Meetings with senior staff from Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit to establish the DHRU
- Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS and SWD.

7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- During 30<sup>th</sup> April Stakeholder Meeting at the Kota Kinabatangan District and village meetings on 1<sup>st</sup> and 2<sup>nd</sup> of May, as well as while conducting interviews, talks were given and leaflets in BM were provided detailing the following – Health risks waterfalls and rivers, Health risks Hunting, Health risks hiking and camping in forest. These leaflets were prepared by EHA and MOH and remind people of the risks posed by zoonosis related to these activities, the things to watch out for and prevention measures.
- Community human-animal contact surveys of human-animal interaction are complete and are being processed by BCI and EHA.
- The modeling team met to discuss how to communicate model output to a public audience.

8. COMMUNICATION AND OUTREACH STRATEGY

The effectiveness of the project will strongly depend on EHA's ability to demonstrate IDEEAL's relevance, technical credentials, successes and long-term benefits to the various target audiences using practical approaches and simplified language. Through targeted marketing and communication techniques the trust of EHA's new and existing project stakeholders will be built. This communication plan will serve as a roadmap throughout the project, ensuring that the project's communication efforts are efficient, effective and sustainable. In the long-run, a properly executed communication plan advances EHA's mission, widens its program reach and improves future funding prospects.

EHA will facilitate communication with USAID and among partners, through in-person meetings, conference calls, written advisories, and timely compliance with all reporting.

8.1 Target audience:

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DOSHS), Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### **8.4 Milestones**

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact survey initiated.

May 2014: Finalized pilot economic model with economic and ecological data from Brazil.

June 2014: Completed the first round of Deep Forest Human Contact surveys



July 2014: 2rd Roundtable - Dialogue with policy makers and key industry partners to discuss the relevance of EID threats to certain policies and programs.

September 2014: 3rd Roundtable - Evaluate results of communication strategy for Year 1 using community surveys, analysis of social media, etc.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Annual Report

Year 1 – October 15, 2013 to October 14, 2014

Submission Date: November 3, 2014

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

Submitted by: Peter Daszak, Chief of Party

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This document was produced for review by the United States Agency for International Development Regional Development Mission for Asia (USAID/RDMA).

I. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2013 – October 14, 2014

## List of Acronyms

BAU	Business as Usual
BCI	Borneo Conservation Initiative
CRI	Centre of Research and Innovation
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
CoP	Chief of Party
DCoP	Deputy Chief of Party
DFHC	DEEP FOREST Human Contact
DG	Director General
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health
MODIS	Moderate Resolution Imaging Spectroradiometer
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
PERHILITAN	Department of Wildlife and National Parks (Malay)
PL	Policy Lead
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority



#### LIST OF ACRONYMS (CONTINUED)

SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). It will include staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

Indicators	Year 1				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b>					
(Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence's partners and stakeholders who are able to utilize the model in land-use planning	0%	-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	0%	-	-	-	-
Number of partnerships developed through the Center of Excellence	0%	-	-	-	-
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	0%	-	-	-	-
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted	(b)(4)	(b)(4)			
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs	0%				
Final model developed and validated as planned	0%				
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (25%), On going activities (25%) and Full implementation/completed (25%)

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

#### 2.1.1 Quarter One

- Discussions about the project began on December 2013 where the Chief of Party (CoP) and Deputy Chief of Party (DCoP) met with USAID/RDMA project representatives in Bangkok. Roles and responsibilities were agreed upon, as were specific aspects of project



planning, implementation and reporting, such as work plans, communication strategies and development of Monitoring and Evaluation (M&E) plans.

- The CoP and DCoP met with project partners, Ministry of Health (MoH), Department of Veterinary Services (DVS), Department of Wildlife and National Parks Peninsular Malaysia (DWNP), Sabah Wildlife Department (SWD), Danau Girang Field Centre (DGFC), Department of State Health Sabah (DSHS) and the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics (FBE) to discuss the aims and timeline for the project and the importance of getting stakeholders from different sectors including government, health practitioners, biodiversity and conservation NGO's, industry and nonprofit sectors involved from the beginning of the project and to develop a plan for establishing the Development and Health Research Unit (DHRU).
- Began preliminary analysis of Deep Forest data that will be used in ecological models including ranked abundance curves and species accumulation curves to assess sampling effort at each of our sites to determine the amount of effort required (in nights) to detect any arbitrary proportion of the estimated asymptotic species richness.
- Secured the core and administrative teams for the project.
- Tracked all expenditures to ensure fiscal responsibility; developed, reviewed, and approved budgets; ensured charges were consistent with applicable regulations and guidelines; prepared financial data for reporting; processed and monitored subcontract.
- Ensured compliance with all travel requests.
- Facilitated communication with USAID and country partners through in-person meetings, conference calls, and reports.

#### 2.1.2 Quarter Two

- In February 2014, CoP, DCoP, SCL, and PL met with the (b)(6) (b)(6) (b)(6) (b)(6) During this meeting a verbal agreement to create the DHRU at UMS was reached. EcoHealth Alliance met with SWD, Sabah Economic and Development Investment Authority (SEDIA), Ministry of Agriculture and Food Industry (MAFI), Ministry of Rural Development (MRD), Sabah Forestry Department (SFD) and Sabah Land and Survey Department (SLSD). The purpose of the meeting, held at SWD, was to introduce EHA to government partners that we have not had previous contact with and to introduce the project while emphasizing that the project is looking for pro-business solutions to land use change and its impact on health.
- The project-launching workshop was held on the 27<sup>th</sup> February at the FBE at UMS. Thirty six (36) participants attended the meeting from the following organizations: WWF, Forest Research Institute Malaysia (FRIM), Institute for Tropical Biodiversity and Conservation (ITBC) UMS, USAID, DWNP, DGFC, Borneo Conservation Initiative



(BCI), HUTAN, Living Landscape Alliance (LSA), SWD, SFD, FBE UMS, FMHS UMS, SLSD and Land Empowerment Animals People (LEAP).

- During this quarter, EHA began the planning and preliminary development of spatial and non-spatial databases. These included disease and economic datasets (gathered from the literature) and land-use/land-cover high-resolution (30 m) data from (b)(6) University of Maryland, for the years 2000 – 2013.
- Similarly, EHA began preliminary analysis of Deep Forest data that was used in ecological models, including ranked abundance curves and species accumulation curves to assess sampling effort at each of our sites to determine the amount of effort required (in nights) to detect any arbitrary proportion of the estimated asymptotic species richness.
- The first baseline survey for stakeholders was implemented at the first roundtable meeting. The survey results were entered into a secure database at EHA for future analysis.
- Local IRB approval was granted from the National Medical Research Registration (NMRR) and National Institute of Health (NIH) for the implementation of the DFHC survey across the land use gradient.

#### 2.1.3 Quarter Three

- In May 2014, 406 DEEP FOREST Human Contact surveys and 406 IDEEAL Baseline Surveys were completed across the land use change gradient: at Gomantong Forest Reserve, Oil Palm Plantations and the villages of Sukau and Bilit neighboring the DEEP FOREST sites.
- For each survey, the team conducted 205 household interviews with respondents living on or near palm oil plantations (disturbed), 152 interviews with individuals living in surrounding small villages (semi disturbed) and 49 interviews with individuals visiting or working inside Gomantong Reserve (pristine), totaling 406 surveys.
- In June 2014, DCoP met with (b)(6) to discuss the IDEEAL project, he expressed great interest in the project and offered his assistance to acquire data, make introductions to other industry players, and raise the possibility of providing additional funding to support Malaysian Masters' or PhD students at the DHRU. DCoP party also met with the Head In Charge of Plantation Sustainability and Quality Management at Sime Darby and the Chief Executive Officer and the Head of Projects for Yayasan Sime Darby (their CSR division). During the meeting, they have agreed to provide us with data from the various conservation projects that they support -- SAFE, the NESTLE Relief Project and their Reforestation program all being good examples -- but stressed that they want to learn more about the model before taking the project to senior management and requesting access to their industry data. A meeting with the conservation projects they support is planned for Y2Q1 well as a meeting to discuss the IDEEAL model in more detail once it is more developed.

- (b)(6)
- In July CoP and DCoP met with the new (b)(6) (b)(6) at DVS to discuss the IDEEAL project. CoP and DCoP met with (b)(6) to further discuss the IDEEAL project and the possibility of (b)(6) providing additional funding. CoP and DCoP met with (b)(6) to discuss the IDEEAL project. DCoP, Senior Modeler (SM) and Economic Modeler (EM) met with (b)(6) (b)(6) to discuss available data sets that could be used for the IDEEAL model and how the Spaces project and IDEEAL project could benefit each other. (b)(6) has spent a lot of time building the necessary relationships in various Sabah government departments to secure data, and seems prepared to share these contacts with the IDEEAL team.
  - DCoP worked closely with (b)(6) (b)(6) to draft the Senate Paper for approval by UMS Senate for the creation of the Development and Health Research Unit and the MOA between EHA and UMS.
  - Developed theoretical economic model structure and refined list of data sets needed for modeling. This list was discussed in detail at the stakeholder meeting held in July at the UMS. Various stakeholders offered to make data sets available to the SM and EM. Follow up planned for Y2Q1 stakeholder meeting.
  - Began data entry, translation and preliminary analysis of the Deep Forest Human Contact (DFHC) surveys.
  - Piloted the economic model using epidemiological, ecological and cost data of Malaria in Brazil. This region is actively researched in terms of land use change and disease surveillance. Regional data included revenues and operation costs for industries using land in the region, ecosystem service values, annual land conversion rates, and total economic cost of a case of malaria. A literature review was conducted to gather this information. This general model is used as the framework to develop specific models for Sabah.

#### 2.1.4 Quarter Four

- On the 15<sup>th</sup> of July 2014, EcoHealth Alliance met with the (b)(6) (b)(6) to further discuss the creation of the DHRU at UMS and to have (b)(6) present the first version of the IDEEAL model using data from the Brazilian Amazon. Following this meeting the DVC met unofficially with the Chairman of the UMS Board of Directors and the Chairman is happy and willing to support the proposal for the establishment of DHRU.
- The DCoP introduced CoP to (b)(6) reaffirmed her support for the IDEEAL project and gave her approval for (b)(6) (b)(6) to begin sharing



DSHS data for use in the IDEEAL model. CoP, DCoP, Science and Policy Advisor (SPA), SM and EM met with (b)(6) who provided disease outbreak data for 12 notifiable diseases for last 10 years.

- The second round table stakeholder meeting was held at the FBE at UMS on the 16<sup>th</sup> of July 2014. Thirty-five (35) participants attended the meeting from the following organizations: DVS, WWF, FRIM, DWNP, DGFC, BCI, HUTAN, LLA, SWD & WRU, SFD, SEDIA, University of Wyoming, FBE UMS, FMHS UMS, and DSHS. Participants were updated on progress to date and the first version of the IDEEAL model was presented using data from the Brazilian Amazon to illustrate how the model will work.
- Preliminary simulations with land use and malaria incidence data from the Brazilian Amazon estimate a \$60 trillion savings over 50 years had land been managed to mitigate disease emergence and maximize ecosystem service production – this example helped show all participants the potential value of the model. The presentation was followed by a more detailed discussion on available data sets. We are now in the process of securing as many of these data sets from the discussed sources as possible.
- The CoP, DCoP, SPA and SM met with USAID/RDMA project representatives in Bangkok to discuss the project. CoP gave a presentation to the Mission on IDEEAL. CoP signed the MOA between EHA, GV and the Malaysian Government. CoP, DCoP, SPA and EM visited all DEEP FOREST sites and neighboring communities and plantations to ensure that EM understands the aims of the DEEP FOREST project and had a better understanding of the sites and their surrounding area.
- In August, DCoP spoke about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference, followed up by an article in the Star newspaper on the 29<sup>th</sup> of September detailing the progress and importance of both the PREDICT and IDEEAL projects. DCoP is in the process of setting up meetings with some of the industry contacts made at this meeting. DCoP will attend Hear of Borneo Conference on 10/11/14 which will be an opportunity to follow up with many of these individuals in person.
- On 27<sup>th</sup> August the Senate paper was endorsed at the faculty level by the Faculty of Business and Economics. We now need the paper to be endorsed by the Centre of Research and Innovation. This is the last step before submitting the paper to the Senate. As the Chairman of the UMS Board of Directors has given unofficial approval for the Unit, which will be made official once the Senate paper is approved, the only remaining hurdle will be developing and signing an MOA.
- DCoP is working with (b)(6) to develop a budget for the first round of students to be enrolled in Master or PHD courses at the DHRU as well as identifying potential students. First Masters Student has been identified by EHA, FBE has a shortlist of potential students it thinks could be a good fit for DHRU. Student projects and additional students will be confirmed by Y2Q2.
- On 9<sup>th</sup> October DCoP met with (b)(6) to discuss the progress with Senate approval for DHRU. DVC made assurances that he was

dealing with the matter personally and planned to get endorsement by the Centre of Research and Innovation (CRI) in time for Octobers Senate meeting.

- On 14<sup>th</sup> October DCoP met with (b)(6) to discuss IDEEAL and PREDICT projects and to follow up on requests for data. Deputy Director reaffirmed SFD support for the IDEEAL project and promised to start providing requested data early in Y2.
- Conducted review of ecosystem service, economic, and epidemiological literatures to identify a range of parameters to use in model sensitivity analysis.
- Continuing to run a sensitivity analysis using high and low estimates of ecosystem service values and health costs.
- Identified several potential methodologies to use to create spatially explicit land use model that can be coupled with a spatial epidemiological model: pair approximation and lattice models.
- Statistical analyses were performed to examine the influence of the gradient level and other predictor variables (e.g. gender, age, ethnicity, etc.) on difference metrics of human-animal contact, as well as to test for significant interactions.

## 2.2 Implementation Status

- Ongoing modeling meetings at EHA and further developed model structure and identified data sets needed in advance of Sabah stakeholder meeting at DHRU in July 2015.
- Continue to locate economic data, land use cover for the region.
- Piloted the economic model using epidemiological, ecological and cost data of Malaria in Brazil. This general model will be used as the framework to develop specific models for Sabah.
- Began data entry and translation of the Deep Forest Human Contact (DFHC) surveys.
- Selected questions relevant to IDEEAL from the DFHC survey pool for preliminary analysis.
- Revised and updated the list of datasets needed for modeling
- Modeling is on track for data acquisition and refinement in Q4 and Y2Q1. Data from PREDICT wildlife disease surveillance (including Sabah) has been made publicly available via Healthmap, and we currently have access to both the raw disease data and the human behavioral survey done under the Deep Forest project. Sabah State Health Department has provided human disease outbreak data (Annex A), and we are currently working to secure permission to access economic information pertaining to the cost of

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human health outbreaks in Sabah. We have been in discussion with Sabah State Health Department, and are aiming to have access to this economic data by Q3.

- DHRU development is behind schedule due to delays with Senate approval. UMS faculty are committed to participation and support of DHRU, and graduate students will be identified and linked into IDEEAL project following meetings planned for December and January 2015. First set of students to be enrolled in Master's and PhD programs related to IDEEAL will begin in March 2015.
- Met with relevant partners to identify data availability. Received strong, positive indications that partners are willing to share data for IDEEAL. Have been discussing the data needed and the available data sets with SWD, UMS, DSHS, SFD, MOH, HUTAN, Living Landscape Alliance, and DVS. We expect data from many partners to start being made available by the end of the November.
- Continuing process of identifying which agencies in Sabah and Malaysia have the best data on land use and land use cover. DSHS will provide disease data in Y2Q1.
- Continuing process of identifying which agencies in Sabah and Malaysia have the economic data needed.

### 2.3 Implementation challenges

- Malaysian Palm Oil Council (MPOC) has been engaged and interested in modeling. Although they were unable to attend Stakeholder meeting in Q2 and Q4, they have been open to meetings and dialogue, and we anticipate a successful engagement with them as a major private industry stakeholder. We need MPOC to attend stakeholder meetings as this will help encourage other industry stakeholders to attend. Stakeholder meeting for Y2Q1 is being planned 6 weeks in advance in a hope to secure MPOC involvement.
- DCoP met with Sime Darby and Yayasan Sime Darby and plans a second meeting in Y2Q1 to build on this new relationship. DSHS has not yet provided details of 10 plantations that assist the DSHS with disease surveillance who, (b)(6) believes, will be interested in taking active role in IDEEAL. DCoP is working on obtaining this information.
- Centre of Development and Health will start as a Unit under the Faculty of Business and Economics and Faculty of Medicine and Health Sciences and will be called the Development and Health Research Unit (DHRU). A Unit at UMS does not have to generate its own funds, it needs to create a network of cooperation and develop positive changes in its field of focus. To be a Centre it will need 3 UMS academic staff as part of the Centre, it will have to generate its own funds through grants or consultancy, and have identified a niche area to develop. If the IDEEAL project is extended beyond the planned 3 years then DHRU will eventually become the Centre for Development and Health.
- Obtaining the data sets we need from government departments is always a challenge especially from those we have not worked with prior to IDEEAL. The Malaysian government in general is very sensitive about sharing data and in our past experience it is not uncommon to have to make several requests and hold several meetings before data

starts to flow. DCoP is maintaining regular contact (email, meetings and phone calls) to move this process forward.

- Getting Industry players who have not heard of EHA before and are wary of NGOs to make time in their schedules for meetings is always challenging. DCoP is attending conferences and organizing meetings to get face time with these people and using established contacts of people and government colleagues who we have worked with in the past to move this forward.
- DCoP had a follow up meeting with (b)(6) on 29<sup>th</sup> Oct and was told that although SFD would be able to share the data requested, due to the department being very busy with centennial celebrations and UNDP etc we should not expect any data till the end of December. DCoP will follow up accordingly.
- In a meeting with (b)(6) on 30<sup>th</sup> Oct DCoP was told that data requested from SWD for IDEEAL would not be available until 2015 once the new Director is chosen to replace (b)(6).
- Deforestation data for Sabah is available for the past 10 years. This time series data is not enough to develop robust estimations of future trends of deforestation. To minimize uncertainty around models of future scenarios of deforestation we need at least 20 consecutive years of data. During Y2 EHA will be working with (b)(6) at the University of Maryland to produce the missing data.
- Internal politics and bureaucracy at UMS have delayed the process with the development of the DHRU. DVC has assured DCoP that the Unit will be established and that is necessary to be patient while UMS goes through their internal approval process. DVC did not get endorsement from CRI in time for October's Senate meeting. DCoP is waiting for confirmation indicating that the problem has been resolved so paper can be presented at November Senate meeting. UMS has been reluctant to discuss details re identifying and funding students until this process is complete.

#### 2.4 M&E Update

- M&E Plan reviewed and resubmitted and currently under revision.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) proposed as the director of the DHRU and is in a position to foster women's participation and leadership in environment and health issues.
- Equal male/female participation planned for stakeholder meeting.
- Plan to have a equal number of male and female students studying PHD and Master at DHRU
- Plan to have equal number of male and female staff involved in running of DHRU



### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP is working to establish meetings with industry players through MPOC, US Embassy. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and Sabah state government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.

To date we have only received data from DSHS, we had been expecting data from SWD and SFD but recently these units informed us that we should expect the data around Y2Q2. We are continuously gathering data from the available literature. For example, specific literature review for Sabah on the cost of diseases, as well as literature on the cost of ecosystem services (e.g., carbon sequestration) is currently being reviewed. We are using this information to calibrate (i.e., perform sensitivity analysis) the models. In case we are unable to find enough data, specifically from Sabah, we will use regional data or global estimates of both disease and ecosystem costs. However, this does not seem to be the case, so far. Gathering data is a sensitive issue and a trust-building process for all those groups involved in the project.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- CoP, DCoP, SCL, and PL met with members of Universiti Malaysia Sabah Faculty of Business and Economics to discuss details of establishing the Development and Health Research Unit in Q2. In Q3 CoP, DCoP SPA, SM and EM met with Deputy Vice Chancellor and the Dean of the School of Business and Economics to continue discussion.
- Roundtable was held in Kota Kinabalu on 27<sup>th</sup> Feb, with CoP, DCoP, SCL, PL, and 36 participants from the following organizations – WWF, Forest Research Institute Malaysia, Institute for Tropical Biodiversity and Conservation UMS, USAID, PERHILITAN, DGFC, Borneo Conservation Initiative, HUTAN, SWD, Sabah Forestry Department, Faculty of Business and Economics UMS, Faculty of Medicine UMS, Land registry Department, and LEAP
- Stakeholders provided the following resources to DHRU:
  - Forestry: statistics on forestry; Forest Research Center in Sandakan collecting primary data; local biologists and researchers at lower Kinabatangan
  - WWF: land use change data
  - HUTAN: field assistants to collect data; network of scientists who are working on similar issues; resource- sharing
  - BCI: local ecological and traditional knowledge, without political alignment
  - SEPA: EIA reports; knowledge; networks
  - EHA: share lessons and experiences from previous collaborations; finding and sharing funding opportunities; networking externally; sample sharing; training

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and protocol sharing; mentoring for graduate students; assistance in journal publications; data on emerging diseases and the environmental drivers; analytical/modeling approaches; fundraising skills

- LEAP: networking
- Business School: physical structure (campus); students; channel for implementations; sustainable business studies that can be shared
- USAID: contribute on the publicity and outreach initiatives at the global level with the project outcomes; help develop networks with project-relevant linkages; advocate for connected environment at intersection of environment and health; leveraging public and private partnership resources
- FRIM: social sciences, zoology, forest management/planning and climate change experts; research centers; forestry publications; contacts at national and international levels; various databases e.g. ethnobotanic/traditional knowledge from Malays and Orang Asli; equipped labs; consultancy services
- PERHILITAN: existing Wildlife Genetics lab for potential collaborations with DHRU, [new genetics/research lab, newly developed Wildlife Disease Surveillance Program]; annual inventory of flora and fauna where EID surveillance can be integrated; Centre - Institute for Biodiversity as a training and collaboration centre, bridging capabilities with the Ministry of Natural Resources and Environment for policy-making processes
- Faculty of Medicine: physical structures - labs, clinics in KK and Sandakan for infrastructure development; TB Research Unit in Kudat; Rural Health Unit in Kudat; human resources - clinicians, students
- Faculty of Business and Economics students: human resources -> data collector, analyzing data, local knowledge, information disseminator, tool for outreach programs
- DGFC: sharing (GIS) data with students, experts
- SWD: source and data collector from the field; bring public awareness to the field
- All roundtable participants completed baseline attitudes and awareness surveys
- On April 30<sup>th</sup> EHA held a Stakeholder Meeting at the Kota Kinabatangan District Office to discuss conducting the DEEP FOREST Human Contact survey and IDEEAL Base Line Survey. In attendance were the Assistant District Officer, Village Heads, Oil Palm Plantation managers (IOI, Sawit Kinabalu, Genting) District Health Officer, SWD, representative from the Native Court, BCI, DCoP and EHA staff.
- A total of 406 DEEP FOREST Human Contact surveys and 422 IDEEAL Baseline Surveys (16 IBS conducted at DO meeting) were completed at Gomantong Forest Reserve, Oil Palm Plantations and the villages of Sukau and Bilit.



- Stakeholders invited to a meeting at DHRU on July 18<sup>th</sup>, 2014. Participants included SWD, UMS, WWF, Hutan, SFD, FRIM, and SEDIA. MPOC could not attend but invited DCoP to attend a Palm Oil conference in August 2014 to present IDEEAL project.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- The Economics Assistant (EA) left EHA in Q3; EA replacement to be hired Y2Q1.

#### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with point of contact at UMS for DHRU (Dr Sarma) to establish formal agreement to host the DHRU.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- November 2014: Signing of MOA between UMS and EHA to coincide with UMS' 20th anniversary.
- 3rd Stakeholder Meeting: Planned for 16th or 17th Dec 2014. Update stakeholders on project progress, share model with Sabah data collected to date, get stakeholder input and follow-up on request for data not yet provided for model.
- Meeting with senior staff from Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit to agree roles of respective parties and management plan for DHRU. Planned for 16th or 17th of December.
- December 2014: 2nd Roundtable with Industry partners - DCoP, SCL, SM, EM meet with Industry partners (who have not attended Stakeholder meetings) to share model with Sabah data collected to date, get industry input and request industry data not yet provided for model. Discuss the relevance of EID threats to certain policies and programs.
- 2nd Roundtable with government partners - DCoP, SCL, SM, EM meet with government partners (who have not attended Stakeholder meetings) to share model with Sabah data collected to date, get government input and request government data not yet provided for model. Discuss the relevance of EID threats to certain policies and programs.
- January 2015: Roundtable at UMS to identify MSc and PhD students to work on IDEEAL-related thesis projects.
- Acquire data from stakeholders; clean/assess datasets; parameterize model using data.

- Test model robustness and stability varying parameters and benefit and cost/damage functions.
- Develop ~~two-dimensional~~spatially explicit land use model framework to link with an epidemiological model to fully capture the effect of land management on outbreak dynamics.

7.1 Required data gathered to run quantitative model

- Will continue to identify data from partners
- Will continue to obtain available temporal, geospatial data of land-use/land-cover and disease data.
- Will continue to obtain available economic parameter data.
- Will begin parameterization of the model using local or regional data.

7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Will develop conceptual framework to explore models for different diseases including emergent and re-emergent diseases
- Will begin literature review to estimate the cost of different ecosystem services in the region.

7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue working to establish the Development and Health Research Unit.
- As of December of 2014, we were still in negotiation with the University Malaysia Sabah for approval to host the Center of Excellence at the University under the School of Business and Economics. The proposal to establish the Development and Health Unit (DHU) required approval by the University Senate, and we have initiated this process. As a contingency, we have also discussed with the Deputy Vice Chancellor of the University the possibility of hosting the DHU under an already existing Center, the EcoCampus, which would not require Senate approval and which would allow us to proceed with IDEEAL activities including the enrollment of students through the Unit and the engagement of faculty from various departments, including the School of Business and Economics, the Medical School, and the Institute for Tropical Biology and Conservation. While we would prefer to ultimately have the Unit situated in the business school, we may keep this as a longer-term goal and proceed in Q2 with the establishment of the Unit under the EcoCampus so that we can meet our milestones for IDEEAL. We will provide an update on this process in the Q2 report.
- Held a quarterly roundtable at UMS on July 16<sup>th</sup> and introduced stakeholders to the first version of the model and got feedback from participants about data sets they have and best source for required data

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- Meeting planned with senior staff from Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit to establish the DHRU did not happen due to miscommunication between UMS staff. This meeting is now planned for 16<sup>th</sup> or 17<sup>th</sup> of December.
- Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS and SWD and other participants.

7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- During 30<sup>th</sup> April Stakeholder Meeting at the Kota Kinabatangan District and village meetings on 1<sup>st</sup> and 2<sup>nd</sup> of May, as well as while conducting interviews, talks were given and leaflets in BM were provided detailing the following – Health risks waterfalls and rivers, Health risks Hunting, Health risks hiking and camping in forest. These leaflets were prepared by EHA and MOH and remind people of the risks posed by zoonosis related to these activities, the things to watch out for and prevention measures.
- Community human-animal contact surveys of human-animal interaction are complete and are being processed by BCI and EHA.
- The modeling team met to discuss how to communicate model output to a public audience.

8. COMMUNICATION AND OUTREACH STRATEGY

EHA has implemented a communications strategy which has included in-person meetings with local partners and stakeholders via the CoE at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content and presentations at scientific and professional meetings.

8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA))

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Process Privilege

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), [b](6) Kent University, HUTAN, WWF, Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*



*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### **8.4 Milestones**

December 2013: CoP and DCoP meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

Feb/Mar 2014: First stakeholder roundtable held at UMS; CoE initiated (DHRU), first meeting with government stakeholder that EHA have not worked with before;

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact Survey (DFHC) initiated.

May 2014: Finalized pilot economic model with economic and ecological data from Brazil.

May 2014: Completed the first round of HACS.

June 2014: First meeting with MPOC.

July 2014: 2nd Stakeholder Roundtable - Participants were updated on progress to date and the first version of the IDEEAL model was presented using data from the Brazilian Amazon to illustrate how the model will work. The presentation was followed by a more detailed discussion on available data sets.

August 2014: DCoP spoke about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference, followed up by an article in the Star newspaper on the 29<sup>th</sup> of September detailing the progress and importance of both the PREDICT and IDEEAL projects.

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

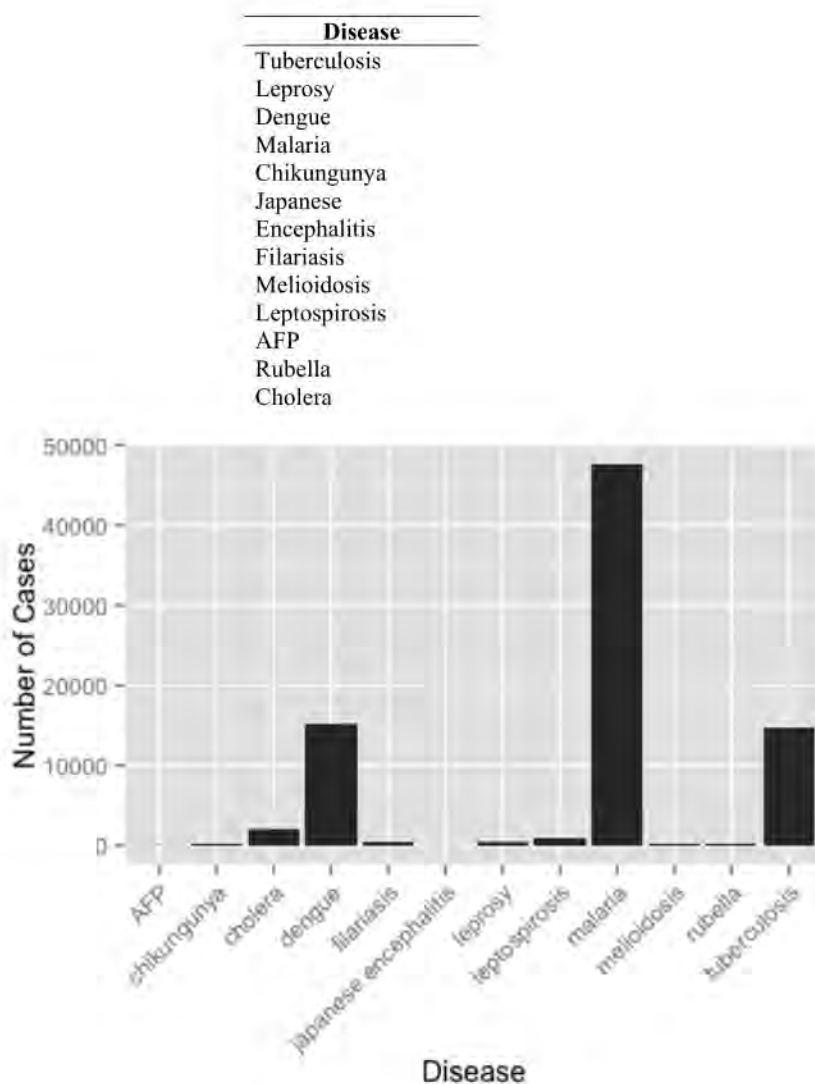
Sept 2014: The pilot simulations of the model estimate total economic loss (accounting for medical cost, foregone productivity, and control expenditures) from endemic malaria in Brazil to be \$1.29 billion annually.

## Annex A

### 1. Summary of Selected Diseases from Sabah for years 2000-2013

We have data on 12 selected diseases that are currently monitored by the CDC-Sabah (Table 1). For each disease we summarized the number of cases, number of deaths, and the mean number of cases (by disease, across all Sabah provinces).

Table 1. List of diseases for which the CDC-Sabah provided outbreak information.



mber of cases of notifiable diseases in all Sabah-provinces for the period 2000-2013  
Dengue, Malaria, and Tuberculosis are diseases with the highest number of cases  
reported. Note that total counts do not adjust for number of years of reporting, and are  
thus biased.

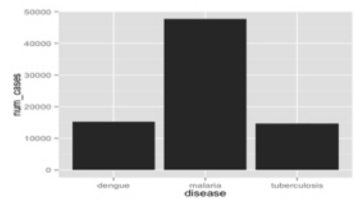
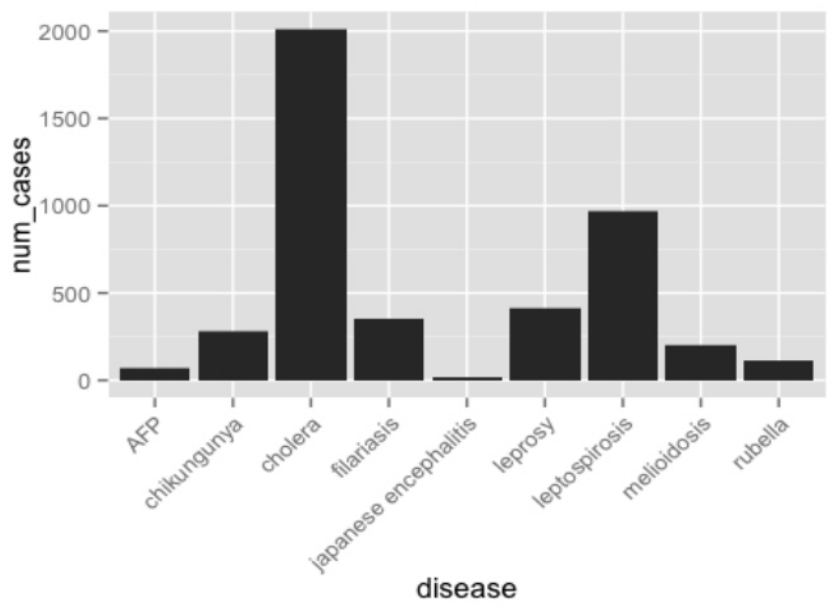




Figure 2. Above panel: Number of cases of all notifiable diseases in Sabah for the period 2000 – 2013, except Dengue, Malaria, and Tuberculosis which are presented in the below panel.

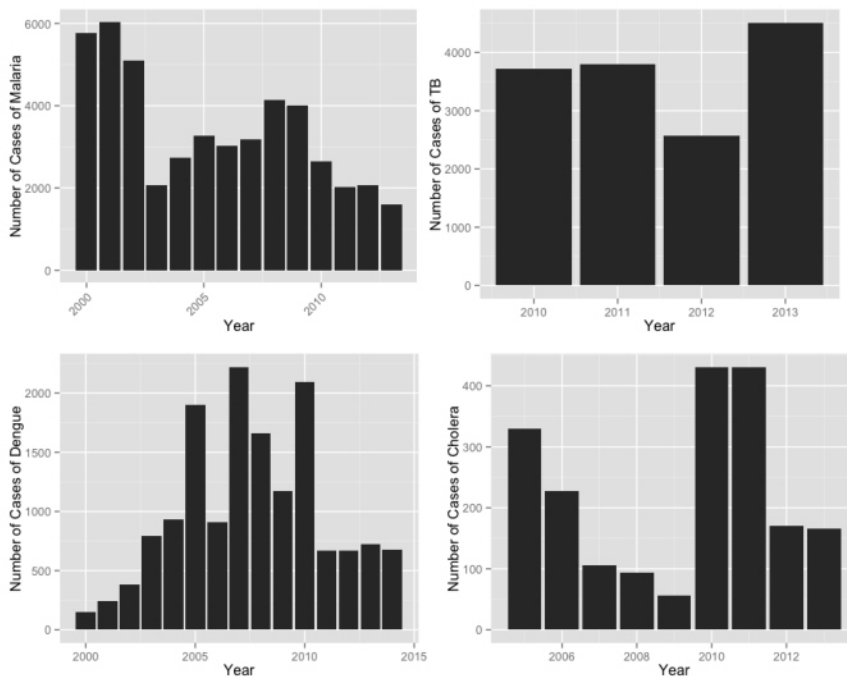


Figure 3. Number of cases of Malaria, Tuberculosis (TB), Dengue and Cholera through time (period 2000 -2013) for all provinces in Sabah. These diseases were chosen due to high number of cases reported.

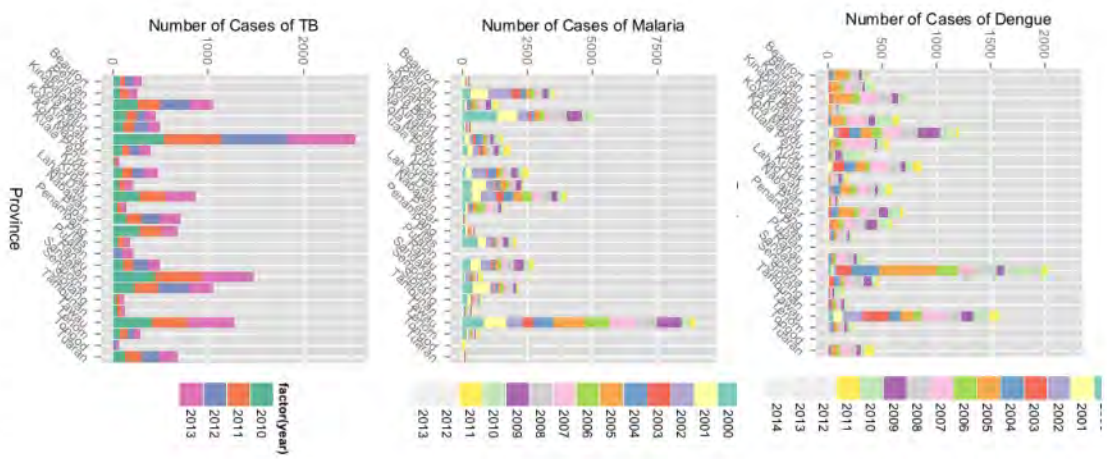


Figure 4. Number of cases of Dengue Malaria and Tuberculosis (TB) segregated by provinces and time (2000 – 2013).

## Annex B

### Spatially explicit land use model.

The current economic model is designed to address two questions: Given that there is a relationship between area of land developed and the magnitude of infections, 1) How much of a landscape should be converted? And 2) Since achieving this optimal allocation of the landscape will take time, then how much should be invested in conversion over time?

At this stage the model simulation output are composed of two numbers: 1) the fraction of the landscape that should be converted (either total or in a time period) and 2) the investment required to achieve that level of conversion. These numbers does not explicitly prescribe *where* conversion should occur. This is because the model employs a standard assumption in optimization: decreasing marginal benefits. In this context, this means that the “best” or most productive and fertile land is converted first, earning the highest return. Land subsequently chosen for conversion should be the next best productive land, and so on. This land conversion will result in the least productive land being converted last. If *where* land is converted, given spatial data on landscape value is available, and is a desired policy implication of the economic model, then it must be extended to geographic space.

Given this assumption, the complete recommendation of the model would likely result in “patchy” conversion if we assume the land quality in the target landscape is heterogeneous. If the land quality is relatively constant across the habitat in question, then the closest, most accessible land at the starting point should be developed. Habitat fragmentation can create new problems in terms of reducing ecosystem function and pathogen dynamics that are currently not capable of being captured by the existing model. For example, the risk of a pathogen spillover event on a highly fragmented landscape with a lot of interspecies contact may not be the same as a system in which land conversion occurs with a more consistent pattern.

The existing economic model can capture the impact of a disease with a specific relationship with space. There is strong evidence that vector borne disease infections increase in number when a landscape is modified, which can be captured in the existing framework. The relationship between pathogen spillover or emerging infectious disease events and how a landscape is used is less clear. To include this, the existing model will need to be modified to include uncertainty about when the event occurs. Additionally, *where* the emergence event occurs is also important because the dynamics and persistence of the event (and therefore cost) will be affected.



## Annex C

### **IDEEAL Toolkit Development Plan**

**Goal: Increased awareness and multi-sector partnerships around the economics of altered landscapes and infectious disease emergence.**

#### **Health Impacts Toolkit**

Year 2 Activities:

Q1: Liase with DFHC project; Integrate findings from models and additional data

Q2: Liase with DFHC project; Integrate findings from models and additional data

Q3: Generate draft toolkit, Conduct external toolkit review

Q4: Generate draft toolkit, Conduct external toolkit review, Finalize toolkit

#### **Detailed outline of activities:**

1. Review IDEEAL baseline survey
  - 1.1. Highlight any gender-related implications identified by baseline survey
  - 1.2. Summarize these issues as well as other key results from the baseline survey
2. Research gender-equity issues in Malaysia
3. Liase with DEEP FOREST
  - 3.1. Collect any initial sample data for toolkit development (to be supplemented by results from econ. model)
4. Work with existing partners (e.g. District Office, SWD, HUTAN, etc.) to catalog and evaluate existing education materials on land-use and health with the goal of determining:
  - 4.1. What is currently being communicated in these areas?
  - 4.2. Are there existing frameworks within which IDEEAL can work?
5. Meet with stakeholders and key partners (Q3)
  - 5.1. Identify priority initial findings to be included in first draft
  - 5.2. Discuss best formats and content for different audiences
    - 5.2.1. Awareness and importance of gender mainstreaming & cultural issues?
    - 5.2.2. Identify specific target audiences for different toolkit versions
  - 5.3. Draft initial versions of toolkits (to be refined by EHA between stakeholder meetings)
    - 5.3.1. Create feedback and editing plan for progress between meetings
6. Share initial draft of toolkit (between Q3 & Q4 meeting) for comments
7. Meet with stakeholders and key partners (Q4)

- 7.1. Review draft toolkit in detail
  - 7.1.1. Test toolkit in interactive sessions with stakeholders
  - 7.1.2. Focus groups with different audiences to gain feedback on content and ease of use of toolkit
- 7.2. Formulate outreach and dissemination plan
  - 7.2.1. Including: detailed timeline, responsible persons, and feedback Mechanisms
- 8. Conduct train of trainers (ToT) for toolkit rollout

**Next steps (Y3):**

- ❖ Update toolkit with new results from modeling (continuous process)
- ❖ Evaluate toolkit rollout
  - Identify target regions or populations for improved outreach and dissemination
  - Qualitative assessment of toolkit utility for target audiences
- ❖ Additional and refresher ToTs for toolkit
  - Identify additional stakeholders and community leaders to be involved in toolkit dissemination



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Infectious Disease Emergence and Economics of Altered Landscapes

## Quarterly Report

Year 2 Quarter 1– October 15, 2014 to January 14, 2015

Submission Date: January 14, 2015

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## I. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2014 – January 14, 2015



## LIST OF ACRONYMS

BAU	Business as Usual
BCI	Borneo Conservation Initiative
BRA	Bornean Rhino Alliance
CoE	Center of Excellence
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DFHC	DEEP FOREST Human Contact
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
IFC	International Finance Corporation
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council

#### LIST OF ACRONYMS (CONTINUED)

MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
PERHILITAN	Department of Wildlife and National Parks (Malay)
PL	Policy Lead
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in earl meetings, and the Faculty of Medicine, the School of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we hope to have it established by Y3, and during this process we continue to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

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- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 2 Quarter 1				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b>					
(Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence's partners and stakeholders who are able to utilize the model in land-use planning	-	-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	-	-	-	-	-
Number of partnerships developed through the Center of Excellence	-	-	-	-	-
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	-	-	-	-	-
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted	(b)(4)				
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional					
Number of graduate students trained					
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support					
Knowledge management framework for the Center of Excellence developed and operationalized					
Strategic sustainability business plan for the Center of Excellence developed and operationalized					
Type of products (e.g., toolkits) developed and used					
Outreach and communications plan developed and implemented					

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- On the 20<sup>th</sup> of October DCoP met with (b)(6) to further discuss available data sets that could be used for the IDEEAL model and contract between EHA and LLA.
- On the 21<sup>st</sup> of October DCoP met with (b)(6) to discuss progress with getting endorsement by the Centre of Research and Innovation (CRI) in time for Octobers Senate meeting. This had still not happened. DCoP

provided additional information about EHA, the work EHA has been doing in Malaysia in the last 10 years, EHA's agreement with the Malaysian government, additional description of the DHRU and its planned activities, details of our achievements through PREDICT and the article that had recently been published in the Star about the PREDICT and IDEEAL project in Malaysia to address the concerns and questions raised during this meeting and by the CRI.

- On the 10<sup>th</sup> of November the DCoP attended the Heart of Borneo Conference organized by Sabah Forest department in Kota Kinabalu Sabah. DCoP was formally introduced to the (b)(6) and had an opportunity to discuss the IDEEAL project with the (b)(6). Further discussions to be held with SFD about IDEEAL in the New Year after SFD centennial celebrations.
- During the Heart of Borneo Conference, the DCoP also met briefly with (b)(6) at Wilmar International Ltd and a well-known sustainable palm oil advocate in Malaysia, to discuss the IDEEAL project. DCoP will work on building this relationship and getting Wilmar to attend stakeholder meetings.
- On the 11<sup>th</sup> of November DCoP received an email from (b)(6) at Sime Darby. DCoP had met with Sime Darby and their CSR wing Yayasan Sime Darby (YSD) back in June to discuss IDEEAL. Although supportive and offering access to data from conservation projects YSD support (b)(6) was not yet prepared to take the IDEEAL project to Sime Darby senior management. DCoP had done some follow up with him at meetings but had not made much progress. However in his email (b)(6) asked advice on an article that appeared in The Ecologist – “Oil palm explosion driving West Africa's Ebola outbreak” by Richard Kock on the 29<sup>th</sup> October. DCoP used this one sided article to illustrate the importance of the IDEEAL project. (b)(6) responded that he has now discussed IDEEAL with Sime Darby Plantations Managing Director and while he or his staff cannot make December's stakeholder meeting (they will be on annual leave) he asked to be sent minutes and will try and have Sime Darby represented at the first Stakeholder meeting of 2015.
- On the 18<sup>th</sup> of November the DCoP attended the The Roundtable on Sustainable Palm Oil's 12<sup>th</sup> Annual Roundtable Meeting in Kuala Lumpur. DCoP met with colleagues from LLA, LEAP, BCI and Bornean Rhino Alliance (BRA) to discuss IDEEAL outreach to small holder plantations, data sets needed for model and next stakeholder meeting. DCoP also met briefly again with Simon Siburat from Wilmar and scheduled a meeting to discuss IDEEAL in detail on the 26<sup>th</sup> November.
- On the 24<sup>th</sup> of November the DCoP met with DVC (b)(6) to discuss lack of progress with getting endorsement from the Centre of Research and Innovation (CRI). DCoP voiced EHA's strong concern over delay in resolving this issue in time for October's Senate meeting and asked for clarification on way forward. DVC asked that DCoP meet with the (b)(6) after that evening. During meeting with UMS Chairman it became



evident that internal politics at UMS were playing a large part in the delay with moving forward with the creation of the DHRU. The Chairman was surprised that the Senate paper for the DHRU that he had already given unofficial approval to back in July had still not been presented to Senate. The DVC asked the Chairman to speak to the Vice Chancellor on his behalf about the creation of the DHRU. The Chairman was not prepared to do this but could see no reason why the DHRU should not proceed and after further discussion DVC promised to meet with Chancellor the next morning and to meet with DCoP following afternoon.

- On the 25<sup>th</sup> of November the DCoP attended the “Monkeybar” meeting – “*Defining the biomedical, environmental and social risk factors for human infection with Plasmodium knowlesi: opportunities for prevention and control of an emerging zoonotic infection*”, funded by the UK Research Councils. EHA has been involved with the “Monkeybar” project through PREDICT and its work with SWD and DSHS. DCoP spoke with (b)(6) (b)(6) at the London School of Hygiene & Tropical Medicine) and (b)(6) (b)(6) at Queen Elizabeth Hospital) about collaboration between Monkeybar and IDEEAL in terms of data sharing and community outreach – this discussion will be continued in 2015. DCoP also met with (b)(6) at FMHS UMS and (b)(6) Department of State Health Sabah to discuss potential candidates for Masters Courses through the DHRU. While (b)(6) feels that FMHS may struggle to find suitable candidates to start in early 2015 as their first graduating class will not be finishing till 2015, (b)(6) felt there are many potential candidates early in their careers at DSHS who would be suitable. (b)(6) agreed to attend next IDEEAL stakeholder meeting to discuss further.
- On the 25<sup>th</sup> November DCoP had a follow up meeting with DVC (b)(6) (b)(6) Following the DVC discussion with VC the DVC informed DCoP that the VC approved the formation of the DHRU but that it would be housed under the EcoCampus an existing center at UMS. DCoP was informed that this would remove the need for approval from CRI or to present the Senate paper. This arrangement would include administrative support from EcoCampus to support CoE activities.
- On the 26<sup>th</sup> of November the DCoP met with (b)(6) (b)(6) at Wilmar International Ltd. Founded in 1991 and headquartered in Singapore, Wilmar is Asia’s leading agribusiness group. They have refineries worldwide and process nearly half the world's crude palm oil. They are the world’s largest processor and merchandiser of palm and lauric oils, as well as largest in edible oils refining and fractionation, oleochemicals, specialty fats and palm biodiesel. They are one of the largest oil palm plantation owners and the largest palm oil refiner in Indonesia and Malaysia. DCoP explained EHA’s work in Malaysia and the PREDICT and IDEEAL projects. (b)(6) was very interested and provided some useful insight into the industry. While he could not promise to have anyone from Wilmar attend December Stakeholder meeting due to the timing (most of his staff will be on annual leave) he plans to have Wilmar represented at first Stakeholder meeting of 2015.

- On the 28<sup>th</sup> of November DCoP was invited to present on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health at a meeting in Kota Kinabalu Sabah. During meeting DCoP established contacts with PACOS Trust a community-based organisation dedicated towards supporting indigenous communities in Sabah. PACOS will be a useful partner when it comes to planning the community outreach component of IDEEAL. They are unable to attend the December stakeholder meeting but plan to be at the first one of 2015.
- On the 17<sup>th</sup> of December 2014, DCoP and SCL met with the DVC of Research (b)(6) of (b)(6) of EcoCampus Management Centre, to further discuss the creation of the DRHU at UMS and the MOU between EHA and UMS. It was confirmed by the DVC that the DRHU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead and (b)(6) would manage administrative and financial logistics. Research fellows from FBE and FMHS would be selected to help run DRHU. UMS legal department is reviewing the MOU and will provide comments to the DCoP before the end of Q1.
- On the 18<sup>th</sup> of December, 2014, the third round table stakeholder meeting was held at the FBE at UMS. Thirty (30) participants attended the meeting from the following organizations: DVS Sabah (this was the first stakeholder meeting they have attended), WWF, FRIM, SWD, BCI, HUTAN, LLA, DGFC, SFD, SEDIA, BRA, FBE UMS, FMHS UMS, ITBC UMS and DSHS. The IDEEAL model was presented in detail, using data from Sabah, and a discussion was held describing the parts of the model, its limitations, and what data would still be needed to refine the model. The group also discussed the importance of graduate student training, and both the Faculty of Medicine and Health Sciences and the Faculty of Business and Economics will provide names of faculty who would serve as research fellows in the DRHU as well as graduate students who would be candidates to conduct research within the DRHU. It was determined that the FBE would not have a new cohort of students until September 2015, but that the Faculty of Medicine would have potential candidates available in January 2015. FRIM and ITBC may also have potential candidates. (b)(6) from DSHS was unable to attend meeting as he was responding to a Dengue outbreak in KK. The DCOP and SCL will follow up with all parties in Q2 and identify graduate students to begin their studies under the DRHU.
- During the meeting DCoP, SCL and SM were able to obtain much needed data sets. HUTAN provided online access to the data used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo'. These 40 years of deforestation data for Borneo is vital for the IDEEAL model. In addition SM met with (b)(6) from LLA who shared her data that DCoP had been working on getting. Important data sets still needed were discussed – forest cover, biodiversity data, value of Ecotourism, missing wages as a result of illness – and potential sources were identified these will be followed up on in Q2.



- An additional 12 IDEEAL Baseline Surveys were collected from participants at the Stakeholder meeting who had not attended before. This data will be used to assess stakeholder learning and participation. The next Stakeholder roundtable will be planned for Q2
- On the 14<sup>th</sup> of January (b)(6) sent the DCoP the Memorandum of Understanding that had been verified by the UMS Legal Department. EHA are currently reviewing this version of MOU. Once DCoP has a version approved by EHA this will be returned to UMS Legal Department to finalize before arrangements are made for signing early in Q2.

#### Modeling activities:

- October 2014: Modified avoided damages equation representing land conversion rate. The new modified equation represents more accurately the development decisions at landscape level. The modified equation now includes an “effort effectiveness” term that modifies the cost of conversion based on the area of remaining undeveloped land. Additionally, the new equation now includes a non-constant ecosystem regeneration term that decreases as more landscape is being developed.
- November 2014: Conducted literature review of 1) spatial dispersal modeling and 2) spatial disease modeling to pair with land conversion modeling. These methodologies were selected as candidate for spatially explicit land conversion modeling.
- November 2014: Parameterized spatially implicit terms in the model (with October modifications) for Sabah, Borneo.
- December 2014: Updated calibration and parameterization of spatially implicit model for Brazilian Amazon to include October modifications.
- December 2014: Began a sensitivity analysis of model outcomes when the infection damage function terms are modified (e.g., government control expenditures and cost of infection).

#### 2.2 Implementation Status

- Ongoing modeling meetings at EHA and further activities to expand datasets available to modeling team. DCoP will follow up with stakeholders from December meeting and identified sources to acquire additional datasets.
- Continue to locate economic data, land use cover for the region. At the December 18<sup>th</sup> stakeholder meeting, HUTAN provided online access to the data used by (b)(6) for his paper ‘Four Decades of Forest Persistence, Clearance and Logging on Borneo’.
- Ran economic model using data from Sabah. This was presented to stakeholders at the meeting to illustrate the structure of the model, and the models uses and limitations were discussed. Completed data entry and translation of the Deep Forest Human Contact (DFHC) surveys.

- Selected questions relevant to IDEEAL from the DFHC survey pool and completed preliminary analysis.
- Revised and updated the list of datasets needed for modeling
- Modeling is on track for data acquisition and refinement in Y2Q2.
  - Avoided damages model improved. Both land conversion and regeneration rates are now implicit terms in the equation. These new terms reflects more accurately the dynamics of land conversion.
  - Exploring spatially explicit methodologies for land conversion model. Began preliminary implementation of basic algorithms in MATLAB.
  - Implemented preliminary spatially explicit model -using the modified avoided damage equation- for the Amazon basin and Sabah.
- DHRU development is progressing. UMS faculty from FBE and FMHS are committed to participation and support of DHRU, and the decision was made by the VC and discussed with the DCoP and SCL to officially house the DHRU under the EcoCampus Center at UMS. The DHRU has been approved and once the MOU is signed we do not see any further obstacles to beginning to work with faculty and students at UMS via the DHRU. Graduate students will be identified and linked into IDEEAL project once identified (target Q3, based on student timing) 2015. First set of students to be enrolled in Master's and PhD programs related to IDEEAL will begin 2015. Faculty will be identified to be research fellows within the DHRU and will serve as advisors for the graduate students who undertake research within the DHRU.
- Ongoing meetings with relevant partners to identify data availability. Have been discussing the data needed and the available data sets with SWD, UMS, DSHS, SFD, MOH, HUTAN, Living Landscape Alliance, and DVS.
- Continuing process of identifying which agencies in Sabah and Malaysia have the best data on land use and land use cover.
- Continuing process of identifying which agencies in Sabah and Malaysia have the economic data needed.
- Beginning to think about challenges of community outreach and which other groups need to be engaged with to make this successful. For example PACOS and BCI will assist with rural and indigenous communities. It is hoped MPOC and Wilmar will help IDEEAL engage with smallholders which will be one of the more challenging groups to get to engage with the IDEEAL project.

### 2.3 Implementation challenges

- Malaysian Palm Oil Council (MPOC) has been engaged and interested in modeling. they were unable to attend Stakeholder meeting in Q1 due to holiday travel. DCoP has made good progress with industry stakeholders Sime Darby and Wilmar. DCoP will follow up

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with these stakeholders in Q2 and 4<sup>th</sup> Stakeholder meeting will be planned further in advance in an attempt to secure participation from these industry stakeholders.

- The DHRU will serve as the beginning of the Center of Excellence, and the DVC discussed the potential for it to become an independent Center. We foresee a potential long-term challenge related to internal structure at UMS. While the DHRU is not housed under the School of Business and Economics, the FBE will not directly control funds to support DHRU, whereas they would control funds if DHRU was housed at FBE. This could impact longer term sustainability, but it will not impact short term functionality of the DHRU. The good news is that the [REDACTED] for the DHRU, [REDACTED] has a long-term vision for the Center and is interested in growing the DHRU by bringing additional funding to expand its scope. We anticipate that any political challenges will be resolved and will work towards converting the DHRU into a Center, or moving it at a later stage into the Faculty of Business and Economics. Meanwhile, we have the full support of the DVC and the Director of the EcoCampus and there is a good relationship between them and the FBE and FMHS. We are able to immediately enroll students and continue to use on-campus facilities for stakeholder meetings, lectures, and public meetings.
- Obtaining the data sets we need from government departments is always a challenge especially from those we have not worked with prior to IDEEAL. The Malaysian government in general is very sensitive about sharing data and in our past experience it is not uncommon to have to make several requests and hold several meetings before data starts to flow. DCoP is maintaining regular contact (email, meetings and phone calls) to move this process forward.
- Getting Industry players who have not heard of EHA before and are wary of NGOs to make time in their schedules for meetings is always challenging. DCoP is attending conferences and organizing meetings to get face time with these people and using established contacts of people and government colleagues who we have worked with in the past to move this forward.
- DCoP had a follow up meeting with [REDACTED] on 29<sup>th</sup> Oct and was told that although SFD would be able to share the data requested, due to the department being very busy with centennial celebrations and UNDP etc we should not expect any data till the end of December. DCoP will follow up accordingly.
- In a meeting with [REDACTED] SWD on 30<sup>th</sup> Oct DCoP was told that data requested from SWD for IDEEAL would not be available until 2015 once the new Director is chosen to replace [REDACTED].
- Availability of regional/local economic and ecological data for Sabah is currently limited. After the December stakeholder meeting we are expecting new information on this.
- Sabah regional disease incidence data is available but limited. It is difficult to accurately calibrate the model with the health data available. We will minimize this problem by performing a detailed sensitivity analysis.

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- The infection costs of land-use related disease specific to Sabah are not available. Currently the model is parameterized using the estimated total cost of a case of dengue fever in Southeast Asia. After the December stakeholder meeting we expect to receive this information.
- We do not currently have Sabah-specific ecosystem service valuations. The model is calibrated using data from studies valuing 'tropical forest' ecosystems worldwide (DeGroot et al., 2012). The estimated values range from 2,000 USD to 50,000 USD per hectare.
- Incorporating aspects of economic dynamic optimization problems into a spatially explicit model with space and time has proved very challenging. Economic dynamic optimization and resource management assume that a manager has knowledge of the current and future value of a resource. The addition of a spatial dimension requires the resource manager to keep track of how resource values are changing over time as well as any changes that may be occurring over space. Values of the landscape can change spatially via economic factors such as proximity to urban centers or roads. Spatial variations in value are difficult to model and even more difficult to communicate conceptually to managers and implement.

#### 2.4 M&E Update

- M&E Plan was approved on December 24, 2014.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) will serve as the (b)(6) DHRU and is in a position to foster women's participation and leadership in environment and health issues.
- Equal male/female participation planned for stakeholder meeting.
- Plan to have a equal number of male and female students enrolled through the DHRU
- Plan to have equal number of male and female staff involved in running of DHRU

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work towards engaging industry players through MPOC, US Embassy. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and Sabah state government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.

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- To date we have only received data from DSHS, we had been expecting data from SWD and SFD but recently these units informed us that we should expect the data around Y2Q2.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- The roundtable held in Kota Kinabalu on 18th December with DCoP, SCL and SM and had 30 participants from the following organizations – DVS Sabah, WWF, FRIM, SWD, BCI, HUTAN, LLA, DGFC, SFD, SEDIA, Bornean Rhino Alliance (BRA), FBE UMS, FMHS UMS, ITBC UMS and DSHS
- During the meeting DCoP, SCL and SM were able to obtain much needed data sets. HUTAN provided online access to the data used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo'. This 40 years of deforestation data for Borneo is vital for the IDEEAL model. In addition SM met with (b)(6) from LLA who shared her data that DCoP had been working on getting. Important data sets still needed were discussed – forest cover, biodiversity data, value of Ecotourism, missing wages as a result of illness – and potential sources were identified these will be followed up on in Q2.
- All new roundtable participants completed baseline attitudes and awareness surveys

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- The Economics Assistant (EA) hired; to begin employment Y2Q2.
- Y2 Work Plan submitted and approved.

#### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with point of contact at UMS for DHRU (b)(6) to establish formal agreement to host the DHRU.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- Completion and signing of MOU with UMS in Q2.
- 4<sup>th</sup> Stakeholder Meeting planned for Q2.
- Identification of graduate students from UMS and government partners to conduct masters or doctoral research through the DHRU.
- Identification of Faculty to become research fellows in the DHRU and advise IDEEAL graduate students.

- Acquisition of additional data sets and further refinement of economic models.
- February 2015: Meeting at UMS to identify MSc and PhD students to work on IDEEAL-related thesis projects.
- Continue to run simulations for sensitivity under various parameter calibrations.
- Further develop and implement the spatially explicit model.
- Validate data gathered for Sabah simulations by continuing to review literature for economic data, namely regional cost of diseases.
- Perform simulations for Sabah using available malaria infection data, as recommended during stakeholder meeting in December 2014.
- Continue gathering additional information. Particularly, ecotourism revenue and continue literature review of factors linking land conversion and disease emergence. Planning of Stakeholders Meeting in the U.S.

#### 7.1 Required data gathered to run quantitative model

- Updated value of ecosystem services produced by tropical forest regions (DeGroot et al., 2012).
- Total area of land under oil palm production in Sabah (recorded annually).
- Total area of mature oil palm in Sabah (recorded annually) .
- Oil palm industry annual revenue
- Oil palm plantation production/operation costs
- Cost of forest clearance for oil palm production
- Economic cost of infection of dengue in Sabah
  - foregone wages
  - treatment
  - transportation to treatment facility (if necessary)

#### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Will continue conceptualizing and exploring spatially explicit models.
- Will continue literature review of factors linking land conversion and disease emergence.

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- 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners
- Will continue working to establish the Development and Health Research Unit.
  - Held a quarterly roundtable at UMS on December 18<sup>th</sup> and introduced stakeholders to the first version of the model using data from Sabah, and a discussion was held describing the parts of the model, its limitations, and what data would still be needed to refine the model.
  - Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS and SWD and other participants.
- 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates
- Beginning to think about challenges of community outreach and which other groups need to be engaged with to make this successful. For example PACOS and BCI will assist with rural and indigenous communities. It is hoped MPOC and Wilmar will help IDEEAL engage with smallholders which will be one of the more challenging and important groups to get to engage with the IDEEAL project.
  - Community human-animal contact surveys of human-animal interaction are complete and are being processed by BCI and EHA.
  - The modeling team met to discuss how to communicate model output to a public audience.
8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the CoE at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content and presentations at scientific and professional meetings.

#### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation), International Finance Corporation (IFC) (guidelines on health impact assessments (HIA))



**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*



*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### **8.4 Milestones**

December 2013: CoP and DCoP meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

Feb/Mar 2014: First stakeholder roundtable held at UMS; CoE initiated (DHRU), first meeting with government stakeholder that EHA have not worked with before;

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact Survey (DFHC) initiated.

May 2014: Finalized pilot economic model with economic and ecological data from Brazil.

May 2014: Completed the first round of DFHC surveys.

June 2014: First meeting with MPOC.

July 2014: 2nd Stakeholder Roundtable - Participants were updated on progress to date and the first version of the IDEEAL model was presented using data from the Brazilian Amazon to illustrate how the model will work. The presentation was followed by a more detailed discussion on available data sets.

August 2014: DCoP spoke about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference, followed up by an article in the Star newspaper on the 29<sup>th</sup> of September detailing the progress and importance of both the PREDICT and IDEEAL projects.

Sept 2014: The pilot simulations of the model estimate total economic loss (accounting for medical cost, foregone productivity, and control expenditures) from endemic malaria in Brazil to be \$1.29 billion annually.

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: 3<sup>rd</sup> Stakeholder Roundtable -Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by David Gaveau for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo'.

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2014: UMS Legal Department provided copy of MOU for EHA review.



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# Infectious Disease Emergence and Economics of Altered Landscapes Quarterly Report

Year 2 Quarter 2– January 15, 2015 to April 14, 2015

Submission Date: April 14, 2015

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	January 15, 2015 – April 14, 2015



## LIST OF ACRONYMS

BAU	Business as Usual
BCI	Borneo Conservation Initiative
BRA	Bornean Rhino Alliance
CoE	Center of Excellence
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
IFC	International Finance Corporation
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council

## LIST OF ACRONYMS (CONTINUED)

MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
PERHILITAN	Department of Wildlife and National Parks (Malay)
PL	Policy Lead
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 2 Quarter 2				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence's partners and stakeholders who are able to utilize the model in land-use planning	-	-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	-	-	-	-	-
Number of partnerships developed through the Center of Excellence	-	-	-	-	-
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	-	-	-	-	-
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted					
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%	-	-	-	-

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- Selected questions relevant to IDEEAL from the DFHC survey pool and completed preliminary analysis to 1) explore differential exposure among various sub-groups (ethnicity, gender, etc.) and 2) inform development of toolkits.
- Stakeholder meeting planned for May 2015; planned to include graduate students, community stakeholders, state agencies and UMS faculty.
- Gender sensitive toolkits in development.

- February 11, 2015: DCoP met with (b)(6) at FMHS UMS, (b)(6) Centre for Disease Control Department of State Health Sabah to further discuss potential candidates for Masters' courses through the DHRU and data needed on cost of disease outbreaks from the Department of State Health, Sabah. (b)(6) agrees to start identifying potential candidates to study for a Masters' or PhD at DHRU, FMHS does not think they will be able to identify any students until September 2015. DSHS agrees to begin compiling the following – breakdown costs based on current policy for each disease (cost of diagnosis, inpatient care versus outpatient care, specialized care versus ICU) for an average case and for a serious case, as well as obtaining costs for the difference in treating local versus non local patients for the following diseases – Nipah, Leptospirosis, Dengue, Malaria, Japanese Encephalitis, Cholera, Yellow Fever, Tuberculosis, Hanta Virus, Leprosy, Chikungunya, Melioidosis and Filiarisis.
- During the meeting, DCoP discussed plans for one day meeting on Diseases Linked to Land Use Change following next stakeholder meeting. DSHS voice their support for this meeting and agree to be one of the speakers and will discuss Dengue. Dengue is a huge problem for department with a 127% increase on cases in February compared to the same period in 2014. Last year, all construction sites in Kota Kinabalu were closed for breaching Dengue guidelines. All contractors paid fines and began work again the next day. DSHS hopes IDEEAL model will provide justification to greatly increase fines for contractors who breach health regulations.
- February 12, 2015: DCoP met with (b)(6) to discuss MOU and DHRU. DCoP addressed issues with MOU raised by EHA during review. DCoP prepared final version for all parties to review. FBE has identified one possible PhD candidate to study under DHRU named (b)(6). DCoP requested details of individual, plans for area of study and budget. DCoP is told that FBE would be unlikely to identify additional students until September 2015. List of Research Fellows for DHRU from FBE and FMHS is confirmed as follows:

#### Faculty of Medicine and Health Sciences

1. (b)(6)
- 2.
- 3.
- 4.
- 5.

#### Faculty of Business and Economics

1. (b)(6)
- 2.
- 3.
- 4.
- 5.

- February 25, 2015: DCoP met with (b)(6) at Sabah Wildlife Department, to discuss potential candidates



from SWD to study at DHRU, and data sets on ecosystem services and biodiversity value. SWD do not have any data on economic value of ecosystem services or biodiversity. Peter and (b)(6) will look into identifying young professionals from within SWD to study at DHRU. DCoP and (b)(6) discussed potential areas for a second round of the HACS.

- February 25, 2015: DCoP met with (b)(6) of SWD, to discuss PREDICT and IDEEAL projects. (b)(6) voiced his thanks for efforts to date and SWD's continued commitment to the IDEEAL and PREDICT collaborations.
- March 4, 2015: DCoP met with (b)(6). MOU has been agreed and DCoP and (b)(6) agreed on plan for signing and identified May 12<sup>th</sup> as date for official signing ceremony, followed by next Stakeholder meeting on May 13<sup>th</sup>, and one day conference on Diseases Linked to Land Use Change on May 14<sup>th</sup>. (b)(6) has identified a second potential PhD candidate which is her Research Assistant, (b)(6). DCoP reiterates request for more details regarding (b)(6) their planned area of study and budget. Research Fellows have received official appointment letter from DVC, but (b)(6) is still not officially appointed to head DHRU.
- March 5, 2015: DCoP met with BCI to discuss second round of HACS. Areas under consideration are Tongod, Telepid, Nabawan, Keningau and Apin Apin. There are logistical and security constraints at some of the sites. BCI agreed to provide a review of each area with pro and cons for each site.
- March 17, 2015: DCoP met with Director of Disease Control Division at MOH and discussed IDEEAL progress to date and plans for next Stakeholder meeting and one day conference on Diseases Linked to Land Use Change.
- March 25, 2015: DCoP presented to group of 16 students and 3 faculty from Portland State University on the IDEEAL and PREDICT projects.
- March 25, 2015: DCoP met with BCI to further discuss HACS and plans for second round including budget. BCI will now develop a review of each area factoring in budget. Discussed toolkit development and stakeholder engagement. BCI agreed that it would be sensible to invite District Officer and Native Chief from Kinabatangan to next stakeholder meeting, as well as managers of Oil Palm plantations where HSCS was conducted but to hold off inviting village heads at this stage. BCI will provide an introduction for DCoP to (b)(6) of PACOS who works with rural and indigenous communities across Sabah. DCoP will invite (b)(6) to represent PACOS at May 13<sup>th</sup> Stakeholder meeting.
- March 25, 2015: DCoP provided signed copy of MOU between EHA and UMS to (b)(6) and reconfirmed plans for May. (b)(6) is no longer (b)(6) of EcoCampus and has been replaced by (b)(6). DCoP reiterated request for meeting with DVC, all research fellows and (b)(6) following MOU signing. DCoP reiterated request for details from FBE potential PhD candidates
- March 26, 2015: DCoP met with (b)(6), Centre for Disease Control Department of State Health, Sabah to further discuss data sets needed related to



cost of disease. As there have been no Yellow Fever or Hanta cases in Sabah, these 2 diseases will be removed from list. Cost of Nipah outbreak will have to be obtained from MOH.

- April 8, 2015: DCoP had another follow up meeting with (b)(6) of Sabah Forestry Department (SFD) (b)(6) was surprised that his officer had not provided economic data requested and will follow-up directly with staff involved.
- April 9, 2015: DCoP met with (b)(6) from TB/Leprosy Control Unit and (b)(6) RKPBV Unit, to further discuss disease data. DSHS agreed to provide as much data as they can by the end of April for outpatient costs for drugs, supportive treatment and diagnostic/laboratory costs for the following diseases: Leptospirosis, Dengue, Malaria, Japanese Encephalitis, Cholera, TB, Leprosy, Chikungunya, Melioidosis and Filariasis. This data will then be added to the model for the next IDEEAL stakeholder meeting on May 13th. DSHS recognizes that they will need assistance from ERHA to compile the rest of the data and has agreed, in principal, to the 3 modelers from EHA to stay on for 10 days after the May 14th Diseases Linked to Land Use Change Conference to assist DSHS with collecting the data for inpatient and specialized care costs for the above diseases and the costs related to manpower, utilities and public health. DCoP is following-up with DSHS Director to confirm.
- April 9, 2015: DCoP met with BCI to discuss review of potential sites for second round of HACS. Plan to focus on two areas: Tongod and Telepid. Telepid will be logistically easier and is a more pristine site. Site visits will be conducted in June and plan to conduct HACS survey in chosen location in July.
- April 15, 2015: DCoP talks with DVC (b)(6) DVC agrees to meeting with EHA, (b)(6) of EcoCampus) and the (b)(6) from FMHS and FBE - (b)(6) (b)(6) (b)(6) to confirm the management structure and role of different parties in the Development and Health Research Unit. DVC gives his consent for meeting on afternoon of May 13<sup>th</sup> with all research fellows to discuss the plans for seminars, workshops etc. to be conducted at DHRU in next 16 months. DVC agreed to advertise event at UMS with posters provided by EHA and through the UMS intranet. CoP, DCoP and SCL to prepare press release for MOU signing and Disease meeting and send to DVC for review.
- DCoP pursued local data sets related to economic value of biodiversity and ecosystem services. Other than value of timber products and oil palm, this data has not been identified locally.

#### Toolkit development:

- Detailed toolkit development plan created.
- Target groups and populations determined (to be updated based on input from stakeholder meeting in May) .



- Research on existing toolkits (health and gender-related) conducted; focus on toolkits developed for use in a variety of resource levels.
  - Toolkit examples and gender-sensitive activities to be presented and adapted at upcoming stakeholder meeting created.
- Organization of toolkits modules and draft list of included tools outlined.
- Created a relational database template for baseline surveys.

#### Modeling activities:

- Preliminary results from subset of DFHC data will be shared with stakeholders and project partners during the next stakeholder meeting in May 2015.
- Completed data entry and translation of IDEEAL baseline surveys from Y1.
- Developing survey methods to spatialize human occupancy along a land-use gradient.
- February 2015, conducted literature review to determine the relationship between land use change and vector-borne diseases to apply to economic land use model. Currently, we are exploring the following scenarios:
  - Increasing government control expenditures and increasing infections with habitat modification.
  - Decrease in or elimination of disease incidence after initial government control effort, usually involving severe habitat modification (e.g., swamp draining in North America).
- February 2015: Implemented functional forms for infection damage function; this was implemented because the current form may result in multiple stable equilibria. Based on this new functional form, we performed a sensitivity analysis on key parameters.
- February 2015: Prepared outline of a manuscript to address spatially explicit land use model.
- March 2015: Updated calibration and parameterization of spatially explicit model. Specifically:
  - Modified assumptions about cost of land conversion 1) land conversion becomes more expensive as more area is converted and 2) land conversion becomes less expensive as more area is converted.
  - Added potential for non-disease ecological collapse (significant drop in ecosystem service production/value from remaining undeveloped landscape) after conversion.

- April 2015: Conducted literature review to update database of economic and biological values of key parameters for model calibration. Economic values for oil palm, forest concessions and resource extraction were updated.
- April 2015: Updated model calibration and parameterization for Brazil and Sabah using new economic values.

## 2.2 Implementation Status

- Ongoing modeling meetings at EHA and further activities to expand datasets available to modeling team. DCoP has followed up with stakeholders from December meeting and is working closely with DSHS to secure the remaining data sets needed related to cost of disease.
- DHRU development is progressing. UMS faculty from FBE and FMHS are committed to participation and support of DHRU, and the decision was made by the VC and discussed with the DCoP and SCL to officially house the DHRU under the EcoCampus Center at UMS. The DHRU has been approved and once the MOU is signed we do not see any further obstacles to beginning to work with faculty and students at UMS via the DHRU. Graduate students will be identified and linked into IDEEAL project once identified (target Q3, based on student timing) 2015. First set of students to be enrolled in Master's and PhD programs related to IDEEAL will begin 2015. Faculty have been identified to be research fellows within the DHRU and will serve as advisors for the graduate students who undertake research within the DHRU.
- Beginning to think about challenges of community outreach and which other groups need to be engaged with to make this successful. For example PACOS and BCI will assist with rural and indigenous communities. It is hoped MPOC and Wilmar will help IDEEAL engage with smallholders, which will be one of the more challenging groups to get to engage with the IDEEAL project.

## 2.3 Implementation challenges

- Malaysian Palm Oil Council (MPOC) has been engaged and interested in modeling. DCoP has sent out invitations to May 13<sup>th</sup> stakeholder meeting and May 14<sup>th</sup> Disease meeting and will follow-up accordingly.
- The DHRU will serve as the beginning of the Center of Excellence, and the DVC discussed the potential for it to become an independent Center. The MOU between EHA and UMS has been approved and we are scheduled to sign it on May 12<sup>th</sup>. The MOU will allow the DHRU to be officially formed. We have the full support of the DVC and the Director of the EcoCampus and there is a good relationship between them and the FBE and FMHS. We are also scheduled to meet and enroll graduate students through the DHRU during our May meetings at UMS. DVC will complete his contract later this year and return to FMHS. As DVC is a Research Fellow at FMHS there is a chance that DHRU will move to be managed under FMHS. DVC has written a letter giving DHRU permission of office use and other facilities at FMHS.



- DCoP has been in communication with Sabah State Department of Health, and they have provided some data sets. We are working to obtain additional data and anticipate cooperation from them and other state agencies.
- Getting Industry players who have not heard of EHA before and are wary of NGOs to make time in their schedules for meetings is always challenging. DCoP is attending conferences and organizing meetings to get face time with these people and using established contacts of people and government colleagues who we have worked with in the past to move this forward.
- Availability of regional/local economic and ecological data for Sabah is currently limited. Other than value of timber products and oil palm this data has not been identified locally.
- Sabah regional disease incidence data is available but limited. We will minimize this problem by performing a detailed sensitivity analysis. Data is now starting to come from DSHS.

#### 2.4 M&E Update

- None to report.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) will serve as the director of the DHRU and is in a position to foster women's participation and leadership in environment and health issues.
- Equal male/female participation planned for stakeholder meeting.
- Plan to have a equal number of male and female students enrolled through the DHRU
- Planned to have equal number of male and female staff involved in running of DHRU, however, only 2 of the 8 staff involved will be women.

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work towards engaging industry players through MPOC, US Embassy. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and Sabah state government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.
- To date we have only received data from DSHS, we had been expecting data from SWD and SFD but recently these units informed us that we should expect the data around Y2Q2.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- DSHS are now working very closely with DCoP to compile disease cost data needed. BCI are very proactive with regards to HACS and community outreach. SWD and SFD continue to promise data, but not yet deliver as of end of Q2. UMS is assisting with development of DHRU, but university politics and bureaucracy are causing complications and delays.
- We have scheduled a stakeholder meeting as well as an additional seminar at UMS on May 13<sup>th</sup> and 14<sup>th</sup>. The aims of the stakeholder meeting are to review the data and analysis we have done so far with our partners, to discuss toolkit creation and what elements would be useful to stakeholders, and to create a plan for public outreach and dissemination of the toolkits and information related to the analyses being done under IDEEAL.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

#### 6. COMMUNICATIONS

- Developed draft media outreach and communications plan (attached).
- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with point of contact at UMS for DHRU (Dr Sarma) to establish formal agreement to host the DHRU.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- MOU signing ceremony with UMS scheduled for May 12<sup>th</sup>.
- 4<sup>th</sup> Stakeholder Meeting scheduled for May 13<sup>th</sup>.
- Disease ecology and economics seminar at UMS May 14<sup>th</sup> with meetings and recruitment of students to conduct research through the DHRU.
- Identification of graduate students from UMS and government partners to conduct Masters' or doctoral research through the DHRU ongoing.

- April 12<sup>th</sup>, meeting with EHA, (b)(6) of EcoCampus) and the (b)(6) FMHS and FBE - (b)(6) (b)(6) (b)(6) (b)(6) to confirm the management structure and role of different parties in the Development and Health Research Unit.



- May 13<sup>th</sup> meeting with all research fellows to discuss plans for seminars, workshops, etc. to be conducted at DHRU in next 16 months.
- Circulate press release for MOU signing and Disease meeting.
- Acquisition of additional data sets and further refinement of economic models.
- Development of methods to quantify human occupancy along the land-use gradient (human occupancy surveys).
- Continue to run simulations for sensitivity under various parameter calibrations.
- Further develop and implement the spatially explicit model.
- Validate data gathered for Sabah simulations by continuing to review literature for economic data, namely regional cost of diseases.
- Perform simulations for Sabah using available malaria infection data, as recommended during stakeholder meeting in December 2014.
- Continue gathering additional information. Particularly, ecotourism revenue and continue literature review of factors linking land conversion and disease emergence. Planning of Stakeholders Meeting in the U.S.
- Australia last july, august
- advisory borad to national academy and env national
- member us advisory committee to the us global change research program\

#### 7.1 Required data gathered to run quantitative model

- Updated value of ecosystem services produced by tropical forest regions (DeGroot et al., 2012).
- Total area of land under oil palm production in Sabah (recorded annually).
- Updated total area of mature oil palm in Sabah (recorded annually).
- Updated oil palm industry annual revenue.
- Updated oil palm plantation production/operation costs.
- Cost of forest clearance for oil palm production.
- Economic cost of infection of dengue in Sabah

- foregone wages
  - treatment
  - transportation to treatment facility (if necessary)
- Acquired, cleaned and processed deforestation data from 2000 – 2013. This dataset has a spatial resolution of 30 m.
  - Began literature review to gather information on vegetation maps circa 1970. These datasets will be used as a baseline to estimate deforestation rates.
- 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed
- Will continue conceptualizing and exploring spatially explicit models.
  - Began analysis on factors linking land conversion and disease emergence.
- 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners
- Will continue working to establish the Development and Health Research Unit.
  - Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS and SWD and other participants.
- 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates
- Outreach and communications strategy will be discussed with stakeholders during May meeting. Community human-animal contact surveys of human-animal interaction are complete and are being processed by BCI and EHA.
  - The modeling team met to discuss how to communicate model output to a public audience.
  - Toolkit development to be discussed in detail at stakeholders meeting in May. This includes:
    - Presenting sample toolkits, deciding on toolkit format(s), discussing non-modeling components to include (e.g. defining and assessing land-cover and land-use types, evaluating gender roles, health and the environment-specific modules.
    - Cataloging current/existing educational materials used by various stakeholders and local groups.
  - Post-stakeholder meeting: conduct meetings with in-country partners to draft toolkit sections.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY



EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the CoE at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content and presentations at scientific and professional meetings.

A draft plan for public communications has been developed and included in this report.

We will discuss and develop public outreach strategies with stakeholders at May 13<sup>th</sup> meeting in Sabah.

## 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA))

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

**I - US Government officials:**

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

## **2 - Ministries and institutional decision-makers:**

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

## **3 - Private partners and industry stakeholders:**

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

## **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

## **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*



*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

December 2013: CoP and DCoP meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

Feb/Mar 2014: First stakeholder roundtable held at UMS; CoE initiated (DHRU), first meeting with government stakeholder that EHA have not worked with before;

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact Survey (DFHC) initiated.

May 2014: Finalized pilot economic model with economic and ecological data from Brazil.

May 2014: Completed the first round of DFHC surveys.

June 2014: First meeting with MPOC.

July 2014: 2nd Stakeholder Roundtable - Participants were updated on progress to date and the first version of the IDEEAL model was presented using data from the Brazilian Amazon to illustrate how the model will work. The presentation was followed by a more detailed discussion on available data sets.

August 2014: DCoP spoke about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference, followed up by an article in the Star newspaper on the 29<sup>th</sup> of September detailing the progress and importance of both the PREDICT and IDEEAL projects.

Sept 2014: The pilot simulations of the model estimate total economic loss (accounting for medical cost, foregone productivity, and control expenditures) from endemic malaria in Brazil to be \$1.29 billion annually.

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

(b)(6)

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU (b)(6)

December 2014: 3<sup>rd</sup> Stakeholder Roundtable –Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time. (b)(6)

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo'.

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for 4<sup>th</sup> Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 2 Quarter 3– April 15, 2015 to July 14, 2015

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(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	April 15, 2015 – July 14, 2015



## LIST OF ACRONYMS

BAU	Business as Usual
BCI	Borneo Conservation Initiative
BRA	Bornean Rhino Alliance
CoE	Center of Excellence
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
IFC	International Finance Corporation
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council

## LIST OF ACRONYMS (CONTINUED)

MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
PERHILITAN	Department of Wildlife and National Parks (Malay)
PL	Policy Lead
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 2 Quarter 3				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence's partners and stakeholders who are able to utilize the model in land-use planning	-	-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	-	-	-	-	-
Number of partnerships developed through the Center of Excellence	-	-	-	-	-
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	-	-	-	-	-
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted	(b)(4)				
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional					
Number of graduate students trained					
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support					
Knowledge management framework for the Center of Excellence developed and operationalized					
Strategic sustainability business plan for the Center of Excellence developed and operationalized					
Type of products (e.g., toolkits) developed and used					
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- April 17 - DCoP spoke with (b)(6) (DHRU) working towards finalizing details for the first conference organized by the Development and Health Research Unit "Links between Land Use Change Development and Health" to be held May 14<sup>th</sup> at UMS.
- April 24 - DCoP presents IDEEAL work in Malaysia to EHA Board of Directors.



- April 28 - DCoP and UMS PoC for DHRU discussed and selected venue for first DHRU conference at Faculty of Medicine; (b)(6) to give opening remarks.
- May 6 - DCoP met with DVC (b)(6) and UMS PoC for DHRU to finalize details for MOU signing on May 12<sup>th</sup>, discuss press release and plans for 4<sup>th</sup> IDEEAL stakeholder meeting on May 13<sup>th</sup>. Meeting would include Research Fellows from DHRU with objective to discuss the plans for seminars, workshops etc. to be conducted at DHRU in next 16 months.
- May 7 - DCoP sends press release to CoP and USAID for approval.
- May 11 - USAID approves press release announcing signing of MoU between EHA and UMS, launching of DHRU and its first official conference on May 14<sup>th</sup>. DCoP makes final arrangements for conference at Faculty of Medicine and signing of MOU at Chancellery.
- May 12 - MOU between UMS and EHA signed. This event was attended by (b)(6) (Research and Innovation) (b)(6) Centre for Research and Innovation, CoP, DCoP and SM. Press coverage for IDEEAL project, MOU signing and first conference for DHRU was carried in 5 local newspapers and 3 local news programs. UMS PoC for DHRU is confirmed by the VC as the first Director of the Development and Health Research Unit. The offices for the DHRU will be located at the Faculty of Medicine and Health Sciences. The administration will be handled by EcoCampus and their new (b)(6) at Faculty of Science and Natural Resources. (b)(6). VC would like to see two publications in international journals related to IDEEAL project in next 16 months. It was proposed during this discussion to invite staff from Sabah Wildlife Department and Department of State Health Sabah to be research fellows at DHRU.
- May 13 - Fourth IDEEAL Stakeholder Meeting was held with 36 participants including CoP, DCoP, SL, and RDMA. The Malaysian Palm Oil Council sent a representative (Ahmad Shahdan) to the meeting for the first time and (b)(6) of PACOS Trust, an organization that aims to engage and empower indigenous peoples also attended for the first time. Other participants were from DGFC, WWF, SWD, WRU, WHU, EHA SFD, LLA, SEDIA, BCI, students and staff from Faculty of Medicine and Health Sciences, students from the Institute for Tropical Biology and Conservation, (b)(6) from Biotechnology Research Institute, (b)(6) of EcoCampus and (b)(6) Faculty of Science and Natural Resources, (b)(6) at Faculty of Humanities, Arts and Heritage, and staff from Faculty of Business and Economics. 11 people had not previously attended a stakeholder meeting and filled in the baseline survey.
- May 13 - First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU. The meeting was attended by 21 people including (b)(6) Ethnography & Development Research Unit, (b)(6) Community Medicine, (b)(6)



(b)(6) (Research and Postgraduates), (b)(6)  
 (b)(6) Faculty of Medicine  
 and Health Sciences, (b)(6)  
 (b)(6) Faculty of Business and Economics, (b)(6)  
 and (b)(6) (Research and Innovation) Faculty of Sustainable Agriculture. Follow  
 up will include planning for seminars and training that includes participants from  
 developing countries and an international meeting in 2016. 5 people had not attended an  
 IDEEAL meeting before and filled in the baseline survey.

- May 13 - CoP, DCoP, SM, and IDEEAL modeling team met with (b)(6)  
 (b)(6) Department of State Health Sabah to discuss the IDEEAL project and  
 data still needed from DSHS for the model. The IDEEAL modeling team were given  
 access to Tawau hospital May 18 - 20 to collect data from DSHS for the IDEEAL model.
- May 14 - The first DHRU conference “Links between Land Change, Development and  
 Health” was held at UMS. 101 attendees included staff and faculty from UMS, and  
 government, industry and NGO stakeholders involved in the IDEEAL project. Speakers  
 included IDEEAL CoP, “Land Use Change, Conservation and Health”; (b)(6)  
 (b)(6) Dept. of Pathobiology and Medical Diagnostics, Faculty Medicine and  
 Health Sciences, UMS, “Land use change and *P. knowlesi* in Northern Sabah: The  
 MONKEYBAR Project”; (b)(6) Sabah Wildlife  
 Department and (b)(6) Wildlife Rescue Unit, “Meliodosis, Land Use Change and  
 Orangutans”; (b)(6) Vector Borne Disease Control Programme,  
 Department of State Health Sabah; “Land Use and Dengue”; (b)(6) “Hendra  
 virus - an Emerging Zoonoses linked to Demographic Shifts in Eastern Australia”;  
 (b)(6) BC Initiative, “Impact of Land Use Change on Rural  
 Communities of Sabah”. 74 people had not attended an IDEEAL meeting before and  
 filled in the baseline survey.
- May 15 - Met with BCI to discuss resources available and their role in development and  
 implementation of toolkits for communities.
- May 18-20 - Hospital visit to Tawau for collection of disease frequency and budget  
 costing data.
- May 21 - DCoP hosted group from UMS around WHGFL and discussed IDEEAL and  
 PREDICT projects.
- May 22 - Met with PACOS to discuss resources available and their role in development  
 and implementation of toolkits for communities.
- June 2 - DCoP met with BCI to further discuss second round of Human Animal Contact  
 Survey. Site visits now planned for July 7-10.
- June 5 - IDEEAL invited to present to PACOS community leader meeting on the  
 IDEEAL project. There were 62 Orang Asli participants from 37 communities. All  
 participants filled in the baseline surveys. A lot of discussion around unexplained deaths  
 in villages and lack of reporting to authorities as well as health impacts of loss of



traditional hunting grounds or water sources. These are health costs not yet explored in the IDEEAL model that needs more investigation.

- June 24 - DCoP met with (b)(6) Clinical Research Centre and (b)(6) from CRC at Hospital Queen Elizabeth to discuss NMRR approval for IDEEAL study. DSHS has decided project does need to be registered but does not need ethical approval, this will be done at the same time as amending approval for next round of Human Animal Contact Survey and will not delay the project.
- June 25 - IDEEAL invited to attend the first meeting of Protective Action for Wildlife in Sabah through Education (PAWSE) campaign. PAWSE focuses on wildlife protection through enhanced education, enforcement and community empowerment. During the meeting SWD and DGFC suggested to include the findings from IDEEAL and the impact on public health caused by zoonotic spillover as a result of anthropogenic activities in their awareness campaign.
- June 25 - First round of Deep Forest sampling for PREDICT 2 begins.
- June 29 - DCoP attends dinner at US Ambassador's Residence in honor of Portland State University (b)(6) and discusses IDEEAL with Ambassador, (b)(6) from WCS.
- June 30 - DCoP discusses possibility of staff conducting studies through DHRU with PERHILITAN.
- July 4 - All data requested from DSHS and Tawau hospital has been received apart from information relating to the health promotion and health costing data for DSHS prevention/promotion activities (e.g. cost of campaigns) and costing information on preventive activities (e.g. dengue spraying).
- July 7-10 - Site visits to Tongod and Telepid to determine which site best for next round of HACS. Telepid will make the better site with a larger population, greater variety of ethnic groups, less challenging logistically and better options for wildlife sampling in the future. However, the Tongod site may be considered in the future as there is a lot of hunting in this area, but current security concerns and logistical challenges do not make this a suitable site at this time.
- July 14 - DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project and the possibility of staff conducting studies through DHRU.

#### Toolkit Development:

- Review of example toolkits and discussion of suggested toolkit outline and sections conducted at stakeholder meeting.
  - Target audiences and components updated based on feedback from stakeholders.



- List of stakeholders specifically interested in being involved with toolkit development and existing partner resources to be used/adapted in toolkit development identified at May stakeholder meeting.
- Continued work on toolkit draft for gender-sensitive health impacts toolkit, including preliminary IDEEAL baseline survey data.
- Draft toolkit presented in-house to EHA staff for feedback (prior to circulation to partners and stakeholders).

#### Modeling activities:

- IDEEAL baseline survey database updated with baseline surveys from stakeholder meeting and DHRU workshop.
- Preliminary descriptive statistics for IDEEAL baseline surveys (Y1 and Y2, excluding Q4) begun.
- Begun preliminary analysis to link deforestation and increase of incidence of Malaria in Sabah.
- In preparation a manuscript describing the economic land use model parameterized with health cost data on Malaria from Brazil.
- Modeling land use decisions over space and time have proven challenging. The dynamic optimization framework implemented in the spatially implicit economic model does not lend well to a spatially explicit application because it results in multiple equilibria, making model output difficult to translate for real-world management recommendations. An alternative approach is being taken that will 1) use the output from the spatially implicit model (% of total area to convert in a given year) and 2) will allocate these values on a spatially explicit landscape (i.e., will find *where* the conversion should occur).
- Algorithms to determine optimal locations on a landscape for conversion to occur year after year are being developed. These algorithms find the most “valuable” places on a geographic landscape for conversion by minimizing the negative impacts of land conversion, such as habitat fragmentation, loss of riparian habitat, and costly transportation networks (distance from existing development).
- A spatially explicit landscape for Sabah is currently being created using geospatial landscape characteristics and ecological and economic spatial data.
- All spatial datasets needed to implement the spatially explicit model has been gathered. Currently, we are preprocessing (cleaning, re-projecting, building metadata) these datasets.
- Continued updates of the model parameters database by Borneo Conservation Initiative (BCI) of DFHC survey data.

- Attended meetings with Sabah Ministry of Health, Department of Wildlife, regional hospital (Tawau, Sabah) to collect Sabah-specific health and ecological data

#### 2.12.2 Implementation Status

- Implementation is on target according to indicators.

#### 2.22.3 Implementation challenges

- Progress being made along each of the indicators. The team remains focused on enrolling students from UMS through the DHRU and engaging a full spectrum of stakeholders that includes private sector, which had been a challenge. However, progress was made on both of these fronts at the last stakeholder meeting. The team was also able to obtain access to additional healthcare data from Sabah which will significantly improve the models.
- Estimating the values and parameters required as inputs to calibrate the model is not straightforward. The effort required to produce estimates for each value used in the model exceeds the scope of the IDEEAL project. Values and parameters are being collected from existing literature including peer-reviewed articles, industry technical reports and government documents. The economic and ecological data gathered in Sabah will improve the sensitivity analysis and increase confidence that the model output is unbiased. A database containing information on relevant parameters has been initiated and continues to be updated.

#### 2.32.4 M&E Update

- None to report.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) will serve as the director of the DHRU and is in a position to foster women's participation and leadership in environment and health issues. There has been a balanced ratio of female and male participants in stakeholder meetings and at the first DHRU conference.
- Equal male/female participation planned for future stakeholder meetings.
- Plan to have a equal number of male and female students enrolled through the DHRU
- Planned to have equal number of male and female faculty involved in DHRU.



### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work towards engaging industry players through MPOC, US Embassy. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and Sabah state government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Stakeholders to be involved in toolkit development identified and have been engaged. Future meeting, specifically around toolkit development is scheduled for August.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

### 6. COMMUNICATIONS

- Developed draft media outreach and communications plan (attached).
- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with point of contact at UMS for DHRU ((b)(6)) to establish formal agreement to host the DHRU.
- Natural Geographic Channel joined the team in the field to discuss PREDICT and IDEEAL work for program called Wildest River about the Lower Kinabatangan Wildlife Sanctuary.

### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- Draft toolkit distributed electronically to in-country stakeholders for initial comments.
- IDEEAL baseline survey summary statistics and initial analyses completed.
- 5<sup>th</sup> Stakeholder Meeting scheduled for August 18-21: objective to draft gender-sensitive health impacts toolkit and an initial dissemination plan.
- 6<sup>th</sup> full stakeholder meeting planned for late September/October.
- Selection and registration of graduate students from UMS and government partners for Masters' or doctoral research through the DHRU.
- Further develop and implement the spatially explicit model using Sabah specific data

## 7.1 Required data gathered to run quantitative model

- Updated value of ecosystem services produced by tropical forest regions (DeGroot et al., 2012).
- Total area of land under oil palm production in Sabah (recorded annually).
- Updated total area of mature oil palm in Sabah (recorded annually).
- Updated oil palm industry annual revenue.
- Updated oil palm plantation production/operation costs.
- Cost of forest clearance for oil palm production.
- Economic cost of infection of dengue in Sabah
  - foregone wages
  - treatment
  - transportation to treatment facility (if necessary)
- Acquired, cleaned and processed deforestation data from 2000 – 2013. This dataset has a spatial resolution of 30 m.
- Began literature review to gather information on vegetation maps circa 1970. These datasets will be used as a baseline to estimate deforestation rates.
- Gathered hospital specific disease frequency and costing records for ten years
- Gathered nationwide cost per bed of infectious disease treatment for Malaysian government.

## 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- We are currently implementing spatially explicit models. Spatially implicit models are used to inform the spatially explicit models.
- Continue analysis on factors linking land conversion and disease emergence.

## 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue working to establish the Development and Health Research Unit.
- Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS and SWD and other participants.
- Selection and registration of graduate students from UMS and government partners for Masters' or Doctoral research through the DHRU is ongoing.



- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and an international meeting in 2016.

#### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Outreach and communications strategy were discussed with stakeholders during May meetings. Follow up meetings are planned for August 18-21.
- The modeling team met to discuss how to communicate model output to a public audience.
- Toolkit development will continue. This includes:
  - Presenting sample toolkits, deciding on toolkit format(s), discussing non-modeling components to include (e.g. defining and assessing land-cover and land-use types, evaluating gender roles, health and the environment-specific modules.
  - Cataloging current/existing educational materials used by various stakeholders and local groups.
- Post-stakeholder meeting: conduct targeted meetings with in-country partners to draft toolkit sections (planned for August 2015).

### 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the CoE at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

#### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA))

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*



*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

### **8.4 Milestones**

December 2013: CoP and DCoP meet with USAID-RDMA and project stakeholders; establish need and direction for communication strategy

Feb/Mar 2014: First stakeholder roundtable held at UMS; CoE initiated (DHRU), first meeting with government stakeholder that EHA have not worked with before;

April 2014: IRB approval received from MREC and NIH; Deep Forest Human Contact Survey (DFHC) initiated.

May 2014: Finalized pilot economic model with economic and ecological data from Brazil.

May 2014: Completed the first round of DFHC surveys.

June 2014: First meeting with MPOC.

July 2014: 2nd Stakeholder Roundtable - Participants were updated on progress to date and the first version of the IDEEAL model was presented using data from the Brazilian Amazon to illustrate how the model will work. The presentation was followed by a more detailed discussion on available data sets.

August 2014: DCoP spoke about PREDICT and IDEEAL at the MPOC International Palm Oil Sustainability Conference, followed up by an article in the Star newspaper on the 29<sup>th</sup> of September detailing the progress and importance of both the PREDICT and IDEEAL projects.

Sept 2014: The pilot simulations of the model estimate total economic loss (accounting for medical cost, foregone productivity, and control expenditures) from endemic malaria in Brazil to be \$1.29 billion annually.

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: 3<sup>rd</sup> Stakeholder Roundtable –Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo'.

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for 4<sup>th</sup> Stakeholder Meeting in Sabah to take place in May 2015.



March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015 CoP, DCoP, SM, met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All data requested from Tawau hospital has been received.

July 2015: All spatial datasets needed for modeling has been received.

July 2015: DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.



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# Infectious Disease Emergence and Economics of Altered Landscapes Annual Report

Year 2 – October 15, 2014 to October 14, 2015

Submission Date: October 30, 2015

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2014 – October 14, 2015

## LIST OF ACRONYMS

BAU	Business as Usual
BCI	BC Initiative
BRA	Bornean Rhino Alliance
CoE	Center of Excellence
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
ICU	Intensive Care Unit
IFC	International Finance Corporation
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health

## LIST OF ACRONYMS (CONTINUED)



MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
NMRR	National Medical Research Register
OCA	Organizational Capacity Assessment
PACOS Trust	Partners of Community Organisations Sabah Trust
PAWSE	Protective Action for Wildlife in Sabah through Education
PERHILITAN	Department of Wildlife and National Parks (Malay)
PL	Policy Lead
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
TOR	Terms of Reference
VBDC Unit	Vector Borne Disease Control Unit
WHGFL	Wildlife Health, Genetic and Forensic Laboratory
WHO	World Health Organization
WHU	Wildlife Health Unit
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 2				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence’s partners and stakeholders who are able to utilize the model in land-use planning		-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	0	(b)(4)			
Number of partnerships developed through the Center of Excellence	0				
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	0				
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted					
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

#### 2.1.1 Quarter One

- October 20 - DCoP met with (b)(6) LLA, partnered with HUTAN) to further discuss available data sets that could be used for the IDEEAL model and continued collaboration between EHA and LLA.
- October 21 - DCoP met with DVC (b)(6) FBE to discuss progress with getting endorsement by the Centre of Research and Innovation



(CRI) in time for October Senate meeting. DCoP provided additional information about EHA's history in Malaysia and its MOA with the government; additional description of the DHRU and its planned activities; details of achievements through PREDICT. Also discussed article in Star about the PREDICT and IDEEAL projects in Malaysia; addressed concerns and questions raised during this meeting and by the CRI.

- November 10 - DCoP attended the Heart of Borneo Conference organized by Sabah Forestry Department in Kota Kinabalu, Sabah. DCoP was formally introduced to the (b)(6) of Sabah Forestry Department, (b)(6) and had an opportunity to discuss the IDEEAL project with the (b)(6) of SFD (b)(6). DCoP also met with (b)(6) of Group Sustainability at Wilmar International Ltd, a well-known sustainable palm oil advocate in Malaysia, to discuss the IDEEAL project.
- November 11 - DCoP received an email from (b)(6) of Plantation Sustainability & Quality Management at Sime Darby. (b)(6) discussed IDEEAL with Sime Darby Plantations Managing Director and while he nor his staff could attend the December stakeholders' meeting he was interested in receiving an update postmeeting.
- November 18 - DCoP attended the The 12<sup>th</sup> Roundtable on Sustainable Palm Oil Annual Meeting in Kuala Lumpur. DCoP met with colleagues from LLA, LEAP, BCI and Bornean Rhino Alliance (BRA) to discuss IDEEAL outreach to small holder plantations, data sets needed for model and future stakeholder meeting.
- November 24 - DCoP met with DVC (b)(6) FBE to discuss lack of progress with getting endorsement from the Centre of Research and Innovation (CRI). DCoP voiced EHA's strong concern over delay in resolving this issue in time for the October Senate meeting and asked for clarification. DVC asked that DCoP meet with the chairman of UMS Board of Directors, (b)(6). During meeting with UMS Chairman, it became evident that internal politics at UMS were playing a large part in the delay with moving forward with the creation of the DHRU. The DVC asked the Chairman to speak to the Vice Chancellor on his behalf about the creation of the DHRU. The Chairman could see no reason why the DHRU should not proceed and after further discussion, DVC promised to meet with Chancellor.
- November 25 - DCoP attended the "Monkeybar" meeting – *"Defining the biomedical, environmental and social risk factors for human infection with Plasmodium knowlesi; opportunities for prevention and control of an emerging zoonotic infection,"* funded by the UK Research Councils. EHA has been involved with the "Monkeybar" project through PREDICT and its work with SWD and DSHS. DCoP spoke with (b)(6) (b)(6) (Monkeybar (b)(6) (b)(6) at the London School of Hygiene & Tropical Medicine) and (b)(6) (Monkeybar (b)(6) of Infectious Disease Unit and (b)(6) at Queen Elizabeth Hospital) about collaboration between Monkeybar and IDEEAL in terms of data sharing and community outreach. DCoP also met with (b)(6) Community Medicine at FMHS UMS and (b)(6) -



Vector Unit, Department of State Health Sabah to discuss potential candidates for Masters' courses through the DHRU.

- November 25 - DCoP had a follow up meeting with DVC (b)(6). Following the DVC discussion with VC, the DVC informed DCoP that the VC approved the formation of the DHRU, but that it would be housed under the EcoCampus -- an existing center at UMS. DCoP was informed that this would remove the need for approval from CRI or to present the Senate paper. This arrangement would include administrative support from EcoCampus to support CoE activities.
- November 26 - DCoP met with (b)(6) of Group Sustainability at Wilmar International Ltd. Founded in 1991 and headquartered in Singapore, Wilmar is Asia's leading agribusiness group. They have refineries worldwide and process nearly half the world's crude palm oil. They are the world's largest processor and merchandiser of palm and lauric oils, as well as largest in edible oils refining and fractionation, oleochemicals, specialty fats and palm biodiesel. They are one of the largest oil palm plantation owners and the largest palm oil refiner in Indonesia and Malaysia. DCoP explained EHA's work in Malaysia and the PREDICT and IDEEAL projects. (b)(6) was very interested and provided some useful insight into the industry.
- November 28 - DCoP was invited to present on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health at a meeting in Kota Kinabalu, Sabah. During meeting, DCoP established contacts with PACOS Trust, a community-based organization dedicated to supporting indigenous communities in Sabah. PACOS will be a useful partner when planning the community outreach component of IDEEAL.
- December 17 - DCoP and SCL met with the DVC of Research, (b)(6) of EcoCampus Management Centre, (b)(6) to further discuss the creation of the DHRU at UMS and the MOU between EHA and UMS. It was confirmed by the DVC that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DHRU lead and (b)(6) would manage administrative and financial logistics. Research fellows from FBE and FMHS would be selected to help run DHRU. UMS legal department is reviewing the MOU and will provide comments to the DCoP.
- December 18 - The Third Roundtable Stakeholder Meeting was held at the FBE at UMS. Thirty (30) participants attended the meeting from the following organizations: DVS Sabah (this was the first stakeholder meeting they have attended), WWF, FRIM, SWD, BCI, HUTAN, LLA, DGFC, SFD, SEDIA, BRA, FBE UMS, FMHS UMS, ITBC UMS and DSHS. The IDEEAL model was presented in detail, using data from Sabah, and a discussion was held describing the parts of the model, its limitations, and what data would still be needed to refine the model. The group also discussed the importance of graduate student training, and both the Faculty of Medicine and Health Sciences and the Faculty of Business and Economics will provide names of faculty who would serve as research fellows in the DHRU, as well as graduate students who would be candidates to



conduct research within the DRHU. It was determined that the FBE would not have a new cohort of students until September 2015, but that the Faculty of Medicine would have potential candidates available in January 2015. FRIM and ITBC may also have potential candidates. (b)(6) from DSHS was unable to attend meeting as he was responding to a Dengue outbreak in KK. During the meeting, DCoP, SCL and SM were able to obtain much needed data sets. HUTAN provided online access to the data used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.' These 40 years of deforestation data for Borneo is vital for the IDEEAL model. In addition SM met with (b)(6) from LLA who shared her data that DCoP had been working on obtaining. Important data sets still needed were discussed – forest cover, biodiversity data, value of Ecotourism, missing wages as a result of illness – and potential sources were identified. Will follow-up in Q2.

- An additional 12 IDEEAL Baseline Surveys were collected from participants at the Stakeholder meeting who had not attended before. This data will be used to assess stakeholder learning and participation. The next Stakeholder roundtable will be planned for Q2.
- January 14 - (b)(6) sent the DCoP the Memorandum of Understanding that had been verified by the UMS Legal Department. EHA is reviewing this version of MOU. Once DCoP has a version approved by EHA this will be returned to UMS Legal Department to finalize before arrangements are made for signing.

#### 2.1.2 Quarter Two

- February 11 - DCoP met with (b)(6) Community Medicine at FMHS UMS, (b)(6) Vector Unit, and (b)(6), Centre for Disease Control Department of State Health Sabah to further discuss potential candidates for Masters' courses through the DHRU and data needed on cost of disease outbreaks from the Department of State Health, Sabah. DSHS agreed to begin compiling the following: breakdown costs based on current policy for each disease (cost of diagnosis, inpatient care versus outpatient care, specialized care versus ICU) for an average case and for a serious case, as well as obtaining costs for the difference in treating local versus non local patients for Nipah, Leptospirosis, Dengue, Malaria, Japanese Encephalitis, Cholera, Yellow Fever, Tuberculosis, Hanta Virus, Leprosy, Chikungunya, Melioidosis and Filiarisis.
- Selected questions relevant to IDEEAL from the DFHC survey pool and completed preliminary analysis to 1) explore differential exposure among various sub-groups (ethnicity, gender, etc.) and 2) inform development of toolkits.
- During the meeting, DCoP discussed plans for one day meeting on Diseases Linked to Land Use Change following next stakeholder meeting. DSHS voiced their support for this meeting and agree to be one of the speakers and will discuss Dengue. Dengue is a huge problem for department with a 127% increase on cases in February compared to the same period in 2014. Last year, all construction sites in Kota Kinabalu were closed for breaching Dengue guidelines. All contractors paid fines and began work again the next

day. DSHS hopes IDEEAL model will provide justification to greatly increase fines for contractors who breach health regulations.

- February 12 - DCoP met with (b)(6) to discuss MOU and DHRU. DCoP addressed issues with MOU raised by EHA during review. DCoP prepared final version for all parties to review. DCoP is told that FBE would be unlikely to identify additional students until September 2015. List of Research Fellows for DHRU from FBE and FMHS is confirmed as follows:

#### Faculty of Medicine and Health Sciences

1. (b)(6)
- 2.
- 3.
- 4.
- 5.

#### Faculty of Business and Economics

1. (b)(6)
- 2.
- 3.
- 4.
- 5.

- February 25 - DCoP met with (b)(6) at Sabah Wildlife Department, to discuss potential candidates from SWD to study at DHRU, and data sets on ecosystem services and biodiversity value. SWD do not have any data on economic value of ecosystem services or biodiversity. (b)(6) will look into identifying young professionals from within SWD to study at DHRU. DCoP and (b)(6) discussed potential areas for a second round of the DFHC surveys.
- February 25 - DCoP met with (b)(6) of SWD, to discuss PREDICT and IDEEAL projects. (b)(6) voiced his thanks for efforts to date and SWD's continued commitment to the IDEEAL and PREDICT collaborations.
- March 4 - DCoP met with (b)(6). MOU has been agreed. Research Fellows have received official appointment letter from DVC, but (b)(6) is still not officially appointed to head DHRU.
- March 5 - DCoP met with BCI to discuss second round of DFHC surveys. Areas under consideration are Tongod, Telepid, Nabawan, Keningau and Apin Apin. There are logistical and security constraints at some of the sites. BCI agreed to provide a review of each area with pro and cons for each site.
- March 17 - DCoP met with Director of Disease Control Division at MOH and discussed IDEEAL progress to date and plans for next Stakeholder meeting and one day conference on Diseases Linked to Land Use Change.



- March 25 - DCoP presented to group of 16 students and 3 faculty from Portland State University on the IDEEAL and PREDICT projects.
- March 25 - DCoP met with BCI to further discuss DFHC surveys and plans for second round including budget. BCI will now develop a review of each area factoring in budget. Discussed toolkit development and stakeholder engagement. BCI agreed that it would be sensible to invite District Officer and Native Chief from Kinabatangan to next stakeholder meeting, as well as managers of Oil Palm plantations where DFHC survey was conducted, but to hold off inviting village heads at this stage. BCI will provide an introduction for DCoP to (b)(6) of PACOS who works with rural and indigenous communities across Sabah.
- March 25 - DCoP provided signed copy of MOU between EHA and UMS to (b)(6). (b)(6) is no longer (b)(6) of EcoCampus and has been replaced by (b)(6). DCoP reiterated request for meeting with DVC, all research fellows and (b)(6) following MOU signing. DCoP reiterated request for details from FBE potential PhD candidates
- March 26 - DCoP met with (b)(6) Centre for Disease Control Department of State Health, Sabah to further discuss data sets needed related to cost of disease. As there have been no Yellow Fever or Hanta cases in Sabah, these 2 diseases will be removed from list. Cost of Nipah outbreak will have to be obtained from MoH.
- April 8 - DCoP had a follow up meeting with (b)(6) of Sabah Forestry Department (SFD). (b)(6) was surprised that his officer had not provided economic data requested and was to follow-up directly with staff involved.
- April 9 - DCoP met with (b)(6) from TB/Leprosy Control Unit and (b)(6), VBDC Unit, to further discuss disease data. DSHS agreed to provide as much data as possible by Q3 for outpatient costs for drugs, supportive treatment and diagnostic/laboratory costs for Leptospirosis, Dengue, Malaria, Japanese Encephalitis, Cholera, TB, Leprosy, Chikungunya, Melioidosis and Filariasis. DSHS recognized that they would need assistance from EHA to compile the rest of the data and agreed, to allow the 3 EHA modelers from EHA to assist with collecting the data for inpatient and specialized care costs for the above diseases and the costs related to manpower, utilities and public health.
- April 9 - DCoP met with BCI to discuss review of potential sites for second round of DFHC surveys. Plan to focus on two areas: Tongod and Telepid. Telepid will be logistically easier and is a more pristine site. Site visits will be conducted in June; plan to conduct DFHC survey in chosen location in July.
- April 15 - DCoP talks with DVC (b)(6). DVC agrees to meeting with EHA, (b)(6) of EcoCampus) and the research fellows from FMHS and FBE - (b)(6). (b)(6) to confirm the management structure and role of different parties in the Development and Health



Research Unit. DVC agreed to advertise event at UMS with posters provided by EHA and through the UMS intranet. CoP, DCoP and SCL to prepare press release for MOU signing and Disease meeting and send to DVC for review.

- DCoP pursued local data sets related to economic value of biodiversity and ecosystem services. Other than value of timber products and oil palm, this data has not been identified, locally.

### 2.1.3 Quarter Three

- April 17 - DCoP spoke with (b)(6) (UMS PoC for DHRU) working towards finalizing details for the first conference organized by the Development and Health Research Unit “Links between Land Use Change Development and Health” to be held May 14<sup>th</sup> at UMS.
- April 24 - DCoP presents IDEEAL work in Malaysia to EHA Board of Directors in New York City.
- April 28 - DCoP and UMS PoC for DHRU discussed and selected venue for first DHRU conference at Faculty of Medicine; (b)(6) (b)(6) to give opening remarks.
- May 6 - DCoP met with DVC (b)(6) and UMS PoC for DHRU to finalize details for MOU signing at Chancellery on May 12<sup>th</sup>, discuss press release and plans for the Fourth IDEEAL Stakeholder Meeting on May 13<sup>th</sup>. Meeting would include Research Fellows from DHRU with objective to discuss the plans for seminars, workshops etc. to be conducted at DHRU in next 16 months.
- May 7 - DCoP sends press release to CoP and USAID for approval.
- May 11 - USAID approves press release announcing signing of MoU between EHA and UMS, launching of DHRU and its first official conference on May 14<sup>th</sup>.
- May 12 - MOU between UMS and EHA signed. This event was attended by (b)(6) (b)(6) (Research and Innovation) (b)(6) Centre for Research and Innovation, CoP, DCoP and SM. Press coverage for IDEEAL project, MOU signing and first conference for DHRU was carried in 5 local newspapers and 3 local news programs. UMS PoC for DHRU, (b)(6), is confirmed by the VC as the first Director of the Development and Health Research Unit. The offices for the DHRU will be located at the Faculty of Medicine and Health Sciences. The administration will be handled by EcoCampus and their new (b)(6) at Faculty of Science and Natural Resources, (b)(6). VC would like to see two publications in international journals related to IDEEAL project in next 16 months. It was proposed during this discussion to invite staff from Sabah Wildlife Department and Department of State Health Sabah to be Research Fellows at DHRU.
- May 13 - Fourth IDEEAL Stakeholder Meeting was held with 36 participants including CoP, DCoP, SL, and RDMA. The Malaysian Palm Oil Council sent a representative



(b)(6) to the meeting for the first time, and (b)(6) of PACOS Trust, an organization that aims to engage and empower indigenous peoples also attended for the first time. Other participants were from DGFC, WWF, SWD, WRU, WHU, EHA SFD, LLA, SEDIA, BCI, students and staff from Faculty of Medicine and Health Sciences, students from the Institute for Tropical Biology and Conservation, (b)(6) from Biotechnology Research Institute, (b)(6) of EcoCampus and (b)(6) Faculty of Science and Natural Resources, (b)(6) at Faculty of Humanities, Arts and Heritage, and staff from Faculty of Business and Economics. 11 people had not previously attended a stakeholder meeting and filled in the baseline survey.

- May 13 - First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU. The meeting was attended by 21 people including (b)(6), Ethnography & Development Research Unit, (b)(6) Community Medicine, (b)(6) (Research and Postgraduates), (b)(6) Faculty of Medicine and Health Sciences, (b)(6) Faculty of Business and Economics, (b)(6), and (b)(6) (Research and Innovation) Faculty of Sustainable Agriculture. Follow up will include planning for seminars and training that includes participants from developing countries and an international meeting in 2016. 5 people had not attended an IDEEAL meeting before and filled in the baseline survey.
- May 13<sup>th</sup> - CoP, DCoP, SM, and IDEEAL modeling team met with (b)(6), (b)(6) Department of State Health, Sabah to discuss the IDEEAL project and data still needed from DSHS for the model. The IDEEAL modeling team was given access to Tawau hospital to collect data from DSHS for the IDEEAL model.
- May 14 - The first DHRU conference “Links between Land Change, Development and Health” was held at UMS. 101 attendees included staff and faculty from UMS, local government, industry and NGO stakeholders involved in the IDEEAL project. Speakers included IDEEAL CoP, “Land Use Change, Conservation and Health”; (b)(6), (b)(6), Dept. of Pathobiology and Medical Diagnostics, Faculty Medicine and Health Sciences, UMS, “Land use change and *P. knowlesi* in Northern Sabah: The Monkeybar Project”; (b)(6) Sabah Wildlife Department and (b)(6) Wildlife Rescue Unit, “Melioidosis, Land Use Change and Orangutans”; (b)(6), (b)(6) Vector Borne Disease Control Programme, Department of State Health Sabah; “Land Use and Dengue”; (b)(6), “Hendra virus - an Emerging Zoonoses linked to Demographic Shifts in Eastern Australia”; (b)(6), BC Initiative, “Impact of Land Use Change on Rural Communities of Sabah.” 74 people had not attended an IDEEAL meeting before and filled in the baseline survey.
- May 15 - Met with BCI to discuss resources available and their role in development and implementation of toolkits for communities.
- May 18 - 20 - Hospital visit to Tawau for collection of disease frequency and budget costing data.



- May 21 - DCoP hosted group from UMS at WHGFL and discussed IDEEAL and PREDICT projects.
- May 22 - Met with PACOS to discuss resources available and their role in development and implementation of toolkits for communities.
- June 2 - DCoP met with BCI to further discuss second round of Human Animal Contact Survey. Site visits now planned for July 7-10.
- June 5 - IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities. All participants filled in the baseline surveys. A lot of discussion around unexplained deaths in villages and lack of reporting to authorities as well as health impacts of loss of traditional hunting grounds or water sources. These are health costs not yet explored in the IDEEAL model that needs more investigation.
- June 24 - DCoP met with (b)(6) Clinical Research Centre and (b)(6) (b)(6) from CRC at Hospital Queen Elizabeth to discuss NMRR approval for IDEEAL study. DSHS has decided project does need to be registered, although it does not need ethical approval. The registration will be done at the same time as the amendment approval for the next round of Human Animal Contact Survey and will not delay the project.
- June 25 - IDEEAL invited to attend the first meeting of Protective Action for Wildlife in Sabah through Education (PAWSE) campaign. PAWSE focuses on wildlife protection through enhanced education, enforcement and community empowerment. During the meeting, SWD and DGFC suggested to include the findings from IDEEAL and the impact on public health caused by zoonotic spillover as a result of anthropogenic activities in their awareness campaign.
- June 25 - First round of Deep Forest sampling for PREDICT 2 begins.
- June 29 - DCoP attends dinner at US Ambassador's Residence in honor of Portland State University (b)(6) and discusses IDEEAL with Ambassador, (b)(6) (b)(6) from WCS.
- June 30 - DCoP discusses possibility of staff conducting studies through DHRU with PERHILITAN.
- July 4 - All data requested from DSHS and Tawau hospital has been received apart from information relating to the health promotion and health costing data for DSHS prevention/promotion activities (e.g. cost of campaigns) and costing information on preventive activities (e.g. dengue spraying).
- July 7-10 - Site visits to Tongod and Telepid to determine which site best for next round of DFHC surveys. Telepid will make the better site with a larger population, greater variety of ethnic groups, less challenging logistically and better options for wildlife sampling in the future. However, the Tongod site may be considered in the future as there



is a lot of hunting in this area, but current security concerns and logistical challenges do not make this a suitable site at this time.

- July 14 - DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute, and discussed the IDEEAL project and the possibility of staff conducting studies through DHRU.

#### 2.1.4 Quarter Four

- July 24 - DCoP met with Counselor for Economic Affairs and Environment, Science, Technology and Health Officer from US Embassy to discuss progress with PREDICT and IDEEAL projects. DCoP asked to provide update on PREDICT and IDEEAL for briefer for US Secretary of State visit to Malaysia in first week of October. Embassy offers to provide assistance with organizing meeting in October with industry players involved in palm oil production, extraction to brief them on IDEEAL and the economic model.
- July 29 - Posters posted at UMS facilities and on UMS intranet advertising DHRU Masters' and PhD opportunities.
- July 30 - DCoP attends WWF conference "Challenges and Opportunities for Biodiversity Conservation in Sabah." DCoP further discussed IDEEAL with (b)(6), the Executive Director of the Bornean Rhino Alliance and Forever Sabah. (b)(6) has lived and worked in Sabah since 1977 and has significant influence with Sabah government.
- July 30 - DCoP met with BCI to finalize details for contract, TOR and timeline for second round of DFHC surveys to be conducted at Telupid.
- August 18 - Toolkit development meeting held at UMS with 14 participants from EHA, DGFC, FRIM, SFD, SWD, WWF, BCI and UMS. This was a very productive meeting with useful input from all parties.
- August 19-20 - (b)(6) attended UMS meeting, "War against mosquito borne diseases." Additional data for toolkit and model were collected, and they followed up with some project partners.
- August 20 - DCoP, (b)(6) met with (b)(6) to discuss IDEEAL toolkit. (b)(6) shared a toolkit for alcohol misuse that she has been using in local communities and provides a lot of useful insight into what will work with local communities.
- August 31 - Identified 6 candidates (4 males and 2 females) for Masters' and PhD studies at DHRU. Potential Masters' students are (b)(6) (EHA), (b)(6) (BCI), and (b)(6), who is already enrolled at FMHS UMS. Those interested in pursuing a PhD degree are (b)(6), who is currently completing a Masters' program at UMS; (b)(6) for DSHS; and (b)(6) for DSHS.
- As of August 31<sup>st</sup>, 673 IDEEAL baseline surveys have been completed; analysis of this data is ongoing. Summary data and data stratified by gender, occupation and date will be



presented at next stakeholder meeting in October 8, and used in health impacts toolkit to show current perceptions.

- September 22 - DCOP met with 5 students interested in a PhD or Masters' through the DHRU to discuss their proposed study preparation for their selection meeting on October 6<sup>th</sup>.
- September 23 - DCOP met with (b)(6) from FMHS to discuss plans for student selection meeting on October 6<sup>th</sup> and DHRU seminars to be held on October 7<sup>th</sup>.
- September 28 - DCOP met with (b)(6) Kinabatangan District Officer to discuss the IDEEAL project and toolkit prior to community meetings planned with Sukau and Bilit.
- September 29 - IDEEAL Toolkit was reviewed at community meeting at Kampong Bilit with 17 participants, and then at a community meeting at Kampong Sukau with 12 participants. The toolkit was presented and explained. Participants have submitted their feedback on how to improve toolkit and make the message clearer. Toolkit is being updated based on this feedback; will send to all stakeholders for final review in November 2015.
- October 6 - Held student selection meeting at FMHS UMS. Of five potential candidates, three have been selected for Masters' research at the DHRU.
  - 1) (b)(6) (EHA) - "Zoonotic viruses in the illegally traded mammals: Sunda Pangolin (*Manis javanica*), Sunda slow loris (*Nycticebus coucang*) and Bornean slow loris (*Nycticebus menagensis*) from Malaysia."
  - 2) (b)(6) (BCI) - "From bush to dinner table: understanding wild meat preparation and consumption by local communities."
  - 3) (b)(6) already enrolled at FMHS UMS Masters' program - "Prevalence and associated environmental and social risk factors of worm infection among rural communities of Northern Sabah."

(b)(6) has already begun her studies; (b)(6) will start early Y3.

- October 7 - Held a seminar session at Faculty of Medicine and Health Sciences. CoP presented on "Communicating Science: Publishing your research and maximizing impact," and (b)(6) presented on "Toolkit development and implementation with the IDEEAL project." This seminar session was attended by 48 participants from Faculty of Medicine and Health Sciences, Department of State Health Sabah, WWF and BCI. The session was well received and future sessions are being planned. Topics will include grant writing, reviewing papers, R (an open source statistical software), and economic modelling.
- October 8 - Held the Fifth IDEEAL Stakeholder Meeting with 30 participants from DGFC, WWF, BCI, SFD, UMS (FMHS, FBE, IBTC) LLA, DSHS, Natural Resources Office and a journalist from Sabah Daily Express. During the meeting, discussed preliminary analysis from the baseline survey, and showed the latest simulations from the IDEEAL model using data on deforestation and prevalence of Malaria in Malaysia that

suggests over-conversion of forest to palm oil is creating welfare and economic losses that eventually might become a burden to the Malaysian government. Also discussed feedback on toolkit development and plans for moving forward with toolkit dissemination.

- October 9 - EHA presented the IDEEAL economic model at the First Industry Outreach Meeting. The meeting was attended by 11 participants from 8 organizations - American Malaysian Chamber of Commerce, Yayasan Sime Darby (CSR for Sime Darby), Sime Darby, Malaysian Palm Oil Council, Wilmar, Johnson and Johnson, Coca Cola and the US Embassy. The model was well received by all participants who recognized that the model could be useful at industry as well as government level to allow for more informed land use change decisions and more sustainable land use policy. EHA is working on refining the model based on comments received prior to the next Industry Outreach Meeting on November 17<sup>th</sup>.
- In Y2, presented two talks related to IDEEAL work at the Third International Southeast Asian Bat Conference in Kuching, August; at the 27<sup>th</sup> International Congress for Conservation Biology, Fourth European Congress for Conservation Biology, August, Montpellier, France.
- Presented posters on IDEEAL at the International One Health Congress, March, Amsterdam, Holland; at the Wildlife Disease Association International Conference in July, Queensland, Australia; and at the International Conference on Emerging Infectious Diseases, in August in Atlanta, USA.

#### 2.1.5 Toolkit Development

- Selected questions relevant to IDEEAL from the DFHC survey pool and completed preliminary analysis to 1) explore differential exposure among various sub-groups (ethnicity, gender, etc.) and 2) inform development of toolkits.
- Gender sensitive toolkits are in development.
- Detailed toolkit development plan created.
- Research on existing toolkits (health and gender-related) conducted; focus on toolkits developed for use in a variety of resource levels.
- Created toolkit examples and gender-sensitive activities; presented and adapted during August stakeholder meeting.
- Outlined organization of toolkit modules and draft list of included tools.
- Created a relational database template for baseline surveys.
- Review of example toolkits and discussion of suggested toolkit outline and sections conducted at stakeholder meeting. Target audiences and components updated based on feedback from stakeholders.



- List of stakeholders specifically interested in being involved with toolkit development and existing partner resources to be used/adapted in toolkit development identified at May stakeholder meeting.
- Continued work on toolkit draft for gender-sensitive health impacts, including preliminary IDEEAL baseline survey data.
- Draft toolkit presented in-house to EHA staff for feedback (prior to circulation to partners and stakeholders).
- Draft toolkit presented to 16 participants from EHA, DGFC, FRIM, SFD, SWD, WWF, BCI, PACOS and UMS who voiced their interest in being involved in toolkit development during May meeting.
- Toolkit updated following these meetings and circulated in house and to 16 participants in August meetings.
- Toolkit has been field tested on communities in Sukau and Bilit on September 29<sup>th</sup> and will be circulated to all stakeholders prior to rollout in early Y3.

#### 2.1.6 Modeling Activities

- IDEEAL baseline survey database updated with baseline surveys from stakeholder meeting and DHRU workshop.
- Began preliminary descriptive statistics for IDEEAL baseline surveys (Y1 and Y2, excluding Q4).
- Began preliminary analysis to link deforestation and increase of incidence of Malaria in Sabah.
- In preparation, a manuscript describing the economic land use model parameterized with health cost data on Malaria from Brazil.
- Algorithms to determine optimal locations on a landscape for conversion to occur year after year are being developed. These algorithms find the most “valuable” places on a geographic landscape for conversion by minimizing the negative impacts of land conversion, such as habitat fragmentation, loss of riparian habitat, and costly transportation networks (distance from existing development).
- A spatially explicit landscape for Sabah is currently being created using geospatial landscape characteristics and ecological and economic spatial data.
- All spatial datasets needed to implement the spatially explicit model has been gathered. Currently, we are preprocessing (cleaning, re-projecting, building metadata) these datasets.



- Continued updates of the model parameters database by BC Initiative (BCI) of DFHC survey data.
- Attended meetings with Sabah Ministry of Health, Department of Wildlife, regional hospital (Tawau, Sabah) to collect Sabah-specific health and ecological data

## 2.2 Implementation Status

- Implementation is on target according to indicators.

## 2.3 Implementation challenges

- Progress is being made along each of the indicators. The team remains focused on enrolling students from UMS through the DHRU and engaging a full spectrum of stakeholders that includes private sector, which had been a challenge. However, progress was made on both of these fronts at the last stakeholder meeting. The team was also able to obtain access to additional healthcare data from Sabah, which will significantly improve the models.
- Collecting data to estimate parameters used in the model has proven difficult because the needed information spans industry, ecology, and socio-economic sectors. The effort required to produce estimates for each value used in the model exceeds the scope of the IDEEAL project. Values and parameters are being collected from existing literature including peer-reviewed articles, industry technical reports and government documents. The economic and ecological data gathered in Sabah will improve the sensitivity analysis and increase confidence that the model output is unbiased. A database containing information on relevant parameters has been initiated and continues to be updated.
- Modeling land use decisions over space and time have proven challenging. The dynamic optimization framework implemented in the spatially implicit economic model does not lend well to a spatially explicit application where landscapes are relatively homogeneous in value (such as forest) because this creates potential for multiple equilibria. The model output difficult to translate for real-world management recommendations because each pilot simulation solved differently based on which equilibria were chosen by the solver algorithm. An alternative approach is being taken that will 1) use the output from the spatially implicit model (% of total area to convert in a given year) and 2) will allocate these values on a spatially explicit landscape (i.e., will find *where* the conversion should occur).

## 2.4 M&E Update

### **The Establishment of the Development and Health Research Unit**

#### **Background**

- The establishment of the DHRU at UMS has been one of the central activities and objectives of the IDEEAL program, occurring alongside the acquisition of data and development of the quantitative models. The nature of the Center of Excellence changed from the original proposal, once we engaged UMS at the beginning of the project and



learned about how their administrative structure works. Briefly, the University distinguishes between a Center and a Research Unit, based on scale, funding, and objectives. Following multiple early meetings with the Deputy Vice Chancellor of the University, it became clear that establishing a true Center would require significant, long-term funding that would endow the Center with full-time administrative staff and offices on campus. Alternatively, a Research Unit could be formed without this type of initial investment, but still hold official status as a formal structure within the University. The Research Unit would have the ability to fulfill the near-term aims of IDEEAL: to link departments, faculties, and students, and provide a forum for all stakeholders to meet and contribute to the work of IDEEAL and discuss issues related to land use change, health and economics. It was agreed by IDEEAL senior management and UMS that a Center would and should remain a longer-term aspiration, with sustainable sources of funding jointly pursued, while the DHRU should be immediately established and serve as an interdisciplinary platform through which IDEEAL stakeholder meetings could be held; outreach tools (e.g. toolkits) could be collaboratively developed and disseminated; where students could pursue graduate studies with supervision from DHRU-affiliated faculty from the business school, medical school and other departments; and which would ultimately serve as the nucleus for an international Center of Excellence.

- The establishment of the DHRU required protracted discussions and faced bureaucratic challenges from within UMS in terms of where it would be housed and how finances would be managed, which delayed its official establishment, however, we were still able to hold full stakeholders meetings, hosted by the School of Business, while the DHRU was being considered by the university governing body. Ultimately, the formation of the DHRU was approved in November 2014 by UMS and it was determined that the DHRU would be housed under an existing Center - EcoCampus, with (b)(6) from the School of Business named as its faculty director ((b)(6)) had been engaged with IDEEAL from the beginning). UMS requested that we establish an MOU between EHA and UMS to facilitate official collaboration and co-supervise students via the DHRU. An MOU was signed on May 12, 2015 (Y2Q2), which formalized mutual commitment to collaboration and to helping fulfill the aims of IDEEAL.

## **Evaluation of the Development Health and Research Unit**

### **Current performance**

- The progress of the DHRU towards its IR outputs are included in the Quarterly reports and specific activities and updates are reported in narrative form. In general, the DHRU has made considerable progress towards its primary goals based on Output Indicators 2.1 a-c (see M&E Figure 2) in that it is a functional unit housed at UMS, has hosted multiple stakeholder meetings, conferences and seminars; has graduate students formally completing their theses on topics relevant to IDEEAL, all in alignment with the aims of IDEEAL and objectives for the DHRU. Most recently, we have identified three graduate students who will complete their studies through the DHRU, which was also a stated aim. The delays in establishing the DHRU have meant that we've primarily tracked progress against the table of outputs provided in the Quarterly reports and in the narratives. We have not yet set up a formalized process for performance review led by the faculty of the DHRU, however this can be achieved in Y3. We held a meeting in April 2014 with faculty to discuss roles and begin planning activities for the DHRU for the remainder of



the project. Areas that will require more concentrated effort to achieve in the final year of the program fall under the administration and program management. The following is a summary of progress against specific DHRU assessment areas as stated in the M&E document (Table 2): Organizational Capacity Assessment Areas.

- *Governance, vision and mission:* The DHRU has faculty who have been named by their department to be affiliated with the Unit. (b)(6) is the current (b)(6) and serves as our primary PoC for organizing activities through the DHRU. She has written a vision statement that aligns with IDEEAL's goals, and details how the Unit may grow into a Center through research and fundraising activities. There is currently no written strategic plan for the Unit, but after multiple meetings at UMS, there is an understanding among participants of the Unit's primary objectives.
- *Administration:* During stakeholder meetings, we have formed committees from DHRU faculty to work on toolkit development and planning seminars. We have agreement from DHRU faculty to supervise three Masters' students who will study within the DHRU. Our primary mode of communication is email and discussions during IDEEAL stakeholder meetings or side meetings held at UMS. While we have consistently had engagement from UMS faculty, state agencies, local NGOs and some private industry, we have not yet engaged members of local communities in stakeholder meetings. To date, community outreach has been initiated using the newly developed toolkits and we will continue to directly engage communities while also aiming to include them in stakeholder meetings at the DHRU. We have included stakeholders in discussion about what services the DHRU may provide to stakeholders. This has been a dynamic process, but major needs identified from stakeholders include training opportunities, research collaboration and co-publication, and providing the quantitative model to end users in a form that will help with evaluation of land management decisions. Additional discussion with stakeholders about seminar and training workshop topics and toolkit content are ongoing.
- *Program Management:* The DHRU's programs and activities have been consistent with the aims of IDEEAL, and working groups within the Unit have begun to coalesce around specific activities such as toolkit development and seminar planning/coordination. On May 13, 2015, we met with DHRU faculty to plan seminars and training workshops and discussed organizing an international conference at the DHRU in 2016. Details of planned activities for the DHRU are included in the annual workplan. While we have initiated baseline surveys of stakeholders within the DHRU to assess their knowledge of land use change and health/economic outcomes, we have not begun the process of collecting feedback from participants about services provided by the DHRU. This is primarily due to the relatively recent establishment of the DHRU and the fact that its activities have primarily focused on stakeholder engagement around the development of the quantitative model and toolkits. In Year 3, we will begin more public outreach, and anticipate being able to collect meaningful feedback about DHRU value and performance at the end of the project, and in subsequent years beyond the current IDEEAL program period. We will use the OCA plan in our M&E document for guidance in developing a QA evaluation at the end of Y3.
- To date, the DHRU has held five stakeholder meetings, one public scientific conference on Land Use Change, Health and Economics, and two seminars, also open to the public.

Meetings have included faculty and students from multiple departments within UMS (consistently from the School of Business, the Medical School, and the Institute for Tropical Biology and Conservation); from Sabah government agencies (e.g. the Sabah Forestry Department, Sabah Wildlife Department, SEDIA, the Sabah State Health Department and the Natural Resources Office); local NGOs (e.g. HUTAN, PACOS, LEAP, BCI and WWF); and the IDEEAL technical leads from EHA.

- *Project Performance Management:* The DHRU has met indicators 1-5 listed in the OCA table. Members understand the aims and activities of the Unit; we have successfully worked in collaboration with stakeholders to develop the quantitative model and toolkits; we are sharing updates on toolkits and models with stakeholders and soliciting feedback to assure that we develop high quality products that will be used by public and private sector stakeholders; and we are tracking progress against performance indicators as described in our quarterly reports. We will leverage existing external resources to support DHRU activities (e.g. student research, co-supervision, collaborative grant writing and publication) beyond the IDEEAL project period, and we continue to seek additional external resources with UMS to support the advancement of the DHRU into an international Center of Excellence.
- *External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU; we are in the process of developing a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated; we have presented on IDEEAL at five international scientific meetings. We issued a joint press release with UMS announcing the opening of the DHRU and the signing of the MOU on May 12, 2015. We've had media engagements, including a reporter from the Sabah Daily Express who joined the CoP and DCoP in Sabah for the stakeholder meetings the week of October 5, 2015. We have provided updates and summaries of IDEEAL to the US Embassy in advance of Secretary of State John Kerry's visit to Malaysia in July, and have been requested to also provide a brief to the Embassy in advance of President Obama's upcoming visit to Malaysia.

### **Challenges and adaptability**

- Establishing the DHRU required a lot of modification and while in principle, the University was very supportive, internal politics and bureaucracy caused delays in setting up a formal structure that would allow faculty to be formally engaged. We experienced reluctance on the part of some faculty to fully participate before the DHRU was officially endorsed by the University. Once it was, and we had signed the MOU, it became easier to conduct activities and productively engage faculty. Having identified three graduate students who will study under the DHRU and having conducted two additional seminars (attended by faculty members from different departments), we believe we will have increased engagement from UMS-DHRU faculty as we enter Y3. Beginning with a research unit was a sound approach, and has allowed us to proceed with IDEEAL stakeholder meetings and student engagement. Developing the DHRU into a full Center and creating a broader international profile will not realistically be achieved during Y3, however, holding an international conference at the DHRU will contribute substantively to creating its international profile.



- Stakeholder engagement was variable in the beginning, and we found that while there were some who consistently attended meetings when invited, it was difficult to attract private sector stakeholders to the meetings at the DHRU. Understanding that there may have been uncertainty on their part about the utility of attending meetings, we overcame this challenge by organizing company-specific meetings, often at KL offices, where we could present the working model, and ultimately, we held an industry-focused stakeholder meeting with several global companies on October 9th in KL. We have also sought to become a member of the Roundtable on Sustainable Palm Oil, in order to have increased exposure to the oil palm sector. We plan on attending an international RSPO meeting in November 2015 where we will present analyses from IDEEAL. To further engage UMS DHRU faculty, we held a specific meeting in August for toolkit development, which was attended by those stakeholders who had expressed interest in past meetings. This helped to generate ideas for additional toolkits and to obtain stakeholder feedback for the toolkit we had generated on land use change and health.
- Data acquisition from State agencies was initially challenging, however, after multiple stakeholder meetings and outreach efforts, we were successful in acquiring access to needed databases.

### **Sustainability**

- The DHRU is intended to serve as a primary forum for engaging land developers, policy makers and communities regarding the health and economic impacts of land conversion. To effectively impact land development policies, we will need to focus over the next 12 months on raising the profile of the DHRU; to reaching out to more developers and policy makers with analyses related to the economic model; and to more fully engaging communities so that they will be more empowered to participate in decisions about land management.
- With the official opening of the DHRU and the signing of an MOU with EHA, the DHRU is currently positioned to develop into a broader information-sharing and research platform. Its sustainability will depend on bringing in additional funding to support long-term research and stakeholder engagement activities on both a local and international scale, however, there are activities that can be continued sustainably with relatively modest support. Specifically, holding meetings to present research findings to land managers and to the public; ongoing student supervision and research support by UMS and EHA faculty; co-publication of analyses and white papers relevant to IDEEAL; and continued development of seminars and international meetings based on topics relevant to land use change, health and economics. Over the next 12 months, we will work to attract private sector support from global enterprises operating in Malaysia or the ASEAN region, which may be a viable way to endow the DHRU and eventually allow it to become a Center. We will work with DHRU faculty to obtain funds to support full-time resident faculty (both from inside and outside Malaysia), who would be focused on developing long-term projects related to IDEEAL and bring in grants and additional resources. EHA staff will write grant proposals and develop projects with private sector partners in the US that build on the existing capacities of the DHRU and help further develop its influence as a regional think-tank.

### **Summary**

- The progress made in establishing the DHRU, engaging stakeholders, developing the models and toolkits and using the DHRU as a forum for discussing and refining these has allowed us to stay on track for meeting targets as defined in the performance indicators by the end of Y3. While there are definitely areas that will require focused effort over the next 12 months (e.g. private sector buy-in and use of the model in decision making), we are confident that we have laid the groundwork for effective outreach to these groups, with the help of the government, academic, and NGO stakeholders who have consistently participated in and supported the DHRU and the aims of IDEEAL.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

(b)(6)

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) will serve as the (b)(6) DHRU and is in a position to foster women's participation and leadership in environment and health issues. There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal male/female participation planned for future stakeholder meetings.
- Plan to have an equal number of male and female students enrolled through the DHRU; final accepted are 1 male and 2 females.
- Planned to have equal number of male and female faculty involved in DHRU.

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work towards engaging industry players through MPOC, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

Stakeholders were involved in toolkit development and have been engaged at the toolkit development meeting in August. Follow-up meetings were scheduled when necessary.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE and FMHS regarding available data sets for IDEEAL and the

Human Animal Contact Survey. DCoP had repeated communication with PoC at UMS for DHRU, (b)(6) and other faculty, (b)(6) to establish formal agreement to host the DHRU.

- Natural Geographic Channel joined the team in the field to discuss PREDICT and IDEEAL work for program called Wildest River about the Lower Kinabatangan Wildlife Sanctuary.
- Journalist from Daily Express in Sabah attended the Fifth Stakeholder Meeting and will be writing a piece about the IDEEAL project.
- Journalist from UK Independent newspaper also attended Fifth Stakeholder Meeting and used it to add depth to his piece on PREDICT, although he did not mention IDEEAL in his story.

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- Final draft of toolkit distributed electronically to in-country stakeholders for last round of comments.
- Start IDEEAL end line survey with partners and communities of Sukau and Bilit.
- Second round of Human Animal Contact Survey in Telupid.
- Second Industry Outreach Meeting at RSPO RT13.
- Start training to facilitate toolkit dissemination.
- Registration of (b)(6) for Masters' research through the DHRU.
- Further develop and implement the spatially explicit model using Sabah specific data.

### 7.1 Required data gathered to run quantitative model

- Updated value of ecosystem services produced by tropical forest regions (DeGroot et al., 2012).
- Total area of land under oil palm production in Sabah (recorded annually).
- Updated total area of mature oil palm in Sabah (recorded annually).
- Updated oil palm industry annual revenue.
- Updated oil palm plantation production/operation costs.



- Cost of forest clearance for oil palm production.
  - Economic cost of infection of Dengue in Sabah
    - foregone wages
    - treatment
    - transportation to treatment facility (if necessary)
  - Acquired, cleaned and processed deforestation data from 2000 - 2013. This dataset has a spatial resolution of 30 m.
  - Began literature review to gather information on vegetation maps circa 1970. These datasets will be used as a baseline to estimate deforestation rates.
  - Gathered hospital specific disease frequency and costing records for ten years.
  - Gathered nationwide cost per bed of infectious disease treatment for Malaysian government.
- 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed
- Currently implementing spatially explicit models, 2-dimensional maps of land allocation. The output of the spatially implicit models are used to inform the mapping of land usage.
  - Continue analysis on factors linking land conversion and disease emergence.
- 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners
- Will continue working to establish the Development and Health Research Unit.
  - Will continue to identify stakeholders for participation in the DHRU with assistance and guidance from UMS, DSHS, SWD and other participants.
  - Selection and registration of graduate students from UMS and government partners for Masters' or Doctoral research through the DHRU is ongoing. Currently three students were selected for participation in the DHRU. Additional student applications will reopen January 2016.
  - Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and an international meeting in 2016.
- 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates



- Outreach and communications strategy were discussed with stakeholders during October meetings.
- The modeling team met to discuss how to communicate model output to a public audience.
- Toolkit development and outreach will continue. This includes:
  - Training local toolkit facilitators to present toolkit to stakeholders, community members, and policy makers.
  - Revising and updating toolkit based on pilot testing.
  - Beginning adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
  - Cataloging current and existing educational materials used by various stakeholders and local groups.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at

corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Sabah Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*



*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### **8.4 Milestones**

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference "Links between Land Change, Development and Health" held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.



September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 3 Quarter 1 – October 15, 2015 to January 14, 2016

Submission Date: March 31, 2016

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2015 – January 14, 2016

## LIST OF ACRONYMS

AMCHAM	American Malaysian Chamber of Commerce
BAU	Business as Usual
BCI	BC Initiative
BORA	Bornean Rhino Alliance
CoE	Center of Excellence
COC	Community Outreach Coordinator
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FELDA	Federal Land Development Authority
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GE	General Electric
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
ICU	Intensive Care Unit
IFC	International Finance Corporation
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MNS	Malaysian Nature Society



## LIST OF ACRONYMS (CONTINUED)

MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
NMRR	National Medical Research Register
OCA	Organizational Capacity Assessment
P&G	Proctor and Gamble
PACOS Trust	Partners of Community Organisations Sabah Trust
PAWSE	Protective Action for Wildlife in Sabah through Education
PEMANDU	Performance Management and Delivery Unit
PERHILITAN	Department of Wildlife and National Parks Peninsular Malaysia
PL	Policy Lead
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEARRP	South East Asia Rainforest Research Partnership
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
TEV	Total Ecosystem Value
TOR	Terms of Reference
VBDC Unit	Vector Borne Disease Control Unit
WHGFL	Wildlife Health, Genetic and Forensic Laboratory
WHO	World Health Organization
WHU	Wildlife Health Unit
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 2				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b>					
(Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence's partners and stakeholders who are able to utilize the model in land-use planning		-	-	-	-
External resources support leveraged for sustaining the Center of Excellence operations	-	-	-	-	-
Number of partnerships developed through the Center of Excellence	-	-	-	-	-
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	-	-	-	-	-
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted		(b)(4)			
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- October 29<sup>th</sup> EHA and BCI conduct site visit to Telupid District to evaluate potential sites for Deep Forest sampling and identify communities for second HACS.
- October 30<sup>th</sup> DCoP met with BCI to discuss second HACS and held Toolkit meetings with the communities of Sukau and Bilit and the plantations surveyed in first HACS.
- DCoP met with (b)(6) for State of Sabah and local PI for HACS to discuss second HACS, updated on IDEEAL model and strategy for engaging with DSHS regarding disease findings from PREDICT and IDEEAL model.



- DCoP met with PACOS Trust to update on IDEEAL model, discuss changes to Toolkit and plan for training their 24 community leaders and presenting toolkit to representatives from the 105 communities they work with in February 2016.
- November 17<sup>th</sup> – 19<sup>th</sup> EHA attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall. The booth had 8 posters - “Health, Economics, and Land Use Change. Infectious Disease Emergence and Economics of Altered Landscapes: IDEEAL Program” - 3 posters detailing the background of the IDEEAL project and the spatial and economic model; 1 poster on “Linking Land-use Change and the Emergence of Infectious Disease” – explaining the link between land use change and disease emergence; 1 poster on “Translating Science into Community Knowledge: Health Impacts of Land-Use Change Toolkit” – explaining the aims of the Toolkit; 1 poster on the “The Economics of Pandemic Prevention: New Strategies to Mitigate Disease Emergence at Source” – detailing the link between PREDICT and IDEEAL work and that it is economically better to spend funds preventing rather than responding to an outbreak; 1 poster on “Bat species and viral diversity across different anthropogenic disturbance gradients in Kinabatangan, Sabah, Malaysia” – describing our findings that low disturbance sites may have animals with a lower number of viruses, and that intact forests may regulate the ecosystem and animal health; and 1 poster on “Assessing viral diversity within non-human primates of Peninsular and Bornean Malaysia.” - detailed findings of measles virus and human Adenovirus G RNA in macaques suggesting that anthrozooonotic viral transmission in people may have occurred from wild macaques. The booth generated a lot of interest from conference participants and 47 people shared their contact information in order to be kept informed about the IDEEAL project.
- November 17<sup>th</sup> Industry meeting 5 people attended from NPHL, Yayasan Sime Darby, Yayasan IAR Indonesia and the American Malaysian Chamber of Commerce (AMCHAM). We presented IDEEAL overview and the model and toolkit. Participants received a copy of the toolkit to review. Yayasan Sime Darby indicated that once they had reviewed the toolkit they would want to meet with DCoP in December to discuss presenting to communities and staff associated with their plantations.
- November 18<sup>th</sup> DCoP, COC, and Corporate Relations Director met with Suffian Muhili- Program Manager for Global Palm Sustainability at Proctor & Gamble. He is very interested in the health aspect of sustainability. They work closely with FELDA Global Ventures which is the business entity for FELDA (the government plantation scheme made up of around 112,635 farmers that was founded to handle the resettlement of rural poor into newly developed areas and to organize smallholder farms growing cash crops.) FELDA Global Ventures is the world’s 3<sup>rd</sup> largest oil palm plantation operator, Malaysia’s leading refined sugar producer and one of the top 5 players for processed rubber. P&G are also running a project with 80,000, independent smallholders on Peninsular Malaysia who supply palm oil to FGV mills. This project – Stallholders Risk Assessment Model will be a good fit for IDEEAL in terms of toolkit and health education. We discussed the possibility of presenting to these communities as well as assisting in risk assessments related to disease emergence. He offered to introduce us to the Performance Management and Delivery Unit (PEMANDU), a unit under the Prime Minister’s Department that oversees implementation and assesses progress of the Economic Transformation Programme and the Government Transformation Programme. DCoP will have follow up meeting with P&G in December.

- November 19<sup>th</sup> - DCoP met with (b)(6), Forest Sustainability Manager for Wilmar and Edrin Moss, Sustainability Manager for Wilmar's Sabah plantations to discuss carrying out Deep Forest sampling on Wilmar plantations, conducting Toolkit and HACS with Wilmar staff and workers and health training with their clinics and workers. We plan to visit the Ribubonus plantation in Telupid District in early 2016. EHA to submit an application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District.
- November 20<sup>th</sup> – DCoP, IDEEAL Epidemiologist, and IDEEAL Team (b)(6) reviewed toolkit and made amendments following Sep 29<sup>th</sup> community meetings with small numbers of the Bilit and Sukau communities to evaluate toolkit. IDEEAL Epidemiologist trains IDEEAL Sabah Team on toolkit facilitation and use.
- November 30<sup>th</sup> – DCoP met with BCI to further discuss second HACS in Telupid District and logistical issues surrounding working on the Wilmar Ribubonus plantation. Discussed toolkit and plans for full-scale community meetings in Sukau and Bilit and with the plantations involved in the HACS in February 2016. Agreed on a work plan for conducting IDEEAL Endline Survey in Q2 with these communities after the toolkit community meetings.
- DCoP met with PACOS, discussed toolkit development and deployment in communities they work with across Sabah. Meeting set for February 25<sup>th</sup> and 26<sup>th</sup> with an expected attendance of 100 participants.
- December 1<sup>st</sup> – DCoP met with (b)(6) of Forever Sabah and (b)(6) to discuss collaboration between IDEEAL and Forever Sabah. Discussed producing a map with (b)(6) detailing Sabah and environmental information to help policy makers involved in land use change make better informed decisions.
- DCoP met with (b)(6) from FMHS at UMS to discuss seminars, funding mechanism for DHRU students, DHRU written management plan; and the creation of a webpage for the DHRU and IDEEAL project for UMS and EHA websites.
- December 9<sup>th</sup> - DCoP met with (b)(6) from HUTAN and (b)(6) Discussed compiling a report for policy makers summarizing collective work done in Sabah and creating map of Sabah detailing areas of land that should be protected, developed and converted back to forest, based on land value in terms of preventing disease emergence, important wildlife habitat, ecosystem services, land that is too flood prone to support agricultural crops, etc.
- December 9<sup>th</sup> – DCoP met with (b)(6), DVC, Research and Innovation, (b)(6), DVC, Academic and International, (b)(6), DHRU and (b)(6) FMHS to discuss mechanism for funding students, web page, and seminars in 2016.
- December 9<sup>th</sup> – DCoP met with (b)(6) from the British High Commission to share details of the PREDICT and IDEEAL work in Sabah. Joined at dinner by (b)(6) from the South East Asia Rainforest Research Partnership (SEARRP), (b)(6) from BORA, (b)(6) from HUTAN and (b)(6) from Malaysian Nature Society (MNS). (b)(6) is highly influential and has been working on environmental issues in Sabah for over 30 years. He can help bring high-level awareness to IDEEAL. All participants were briefed on IDEEAL project to date.



- December 11<sup>th</sup> – DCoP met with the new (b)(6) of DWNP (b)(6) and new (b)(6) and provided update on IDEEAL work to date.
- December 12<sup>th</sup> – (b)(6) gave talk on “Bat and viral diversity survey along the disturbance gradients at Lower Kinabatangan River Valley, Sabah, Malaysia.” (b)(6) presented on “Land conversion and the economics of disease emergence in Sabah, Malaysia” at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty India. Both presentations were well received and were awarded “Best Presentation.”
- December 23<sup>rd</sup> - Submitted application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District.
- January 14<sup>th</sup> – DCoP met with newly confirmed (b)(6) of DVS, (b)(6) and briefed him on IDEEAL.
- DCoP spoke with (b)(6) and confirmed meeting with P&G for January 18<sup>th</sup>.

#### 2.1.1 Toolkit Development

- Toolkit updated following pilot testing and industry input.
- Toolkit presented and discussed at RSPO.
  - Toolkit-specific poster presented at EHA booth at RSPO
  - Toolkit distributed to select industry partners
- Initial facilitators trained in toolkit facilitation and use.
- Toolkit dissemination plan specifics formalized.
- Practiced presentation of toolkit, specifically for community audiences conducted by recently trained facilitator.

#### 2.1.2 Modeling Activities

- Began model translation to an open source platform. Due to the particular model formulation that allows estimation of the percentage of land to be converted over multiple period of time, we have used proprietary libraries implemented in the software Matlab and Mathematica. Converting the model to an open source platform, such as the statistical program R, will allow us to transfer the technology we developed to the DHRU.
- Began research on the potential use of Marxan – a decision support software for land use planning – and its integration with the economic model. In principle, this integration will provide a number of optimal options that allows efficient allocation of resources to develop and conserve land.
- Estimated the annual economic impact of malaria in Sabah. We found that a total of USD \$196,290 are spent for inpatient cases whereas a total of USD \$97,200 are spent for outpatient cases. These estimates do not take into account the economic cost of deaths (approximately >20/year).

- Began estimation of annual economic impact of dengue fever in Sabah. We will include this estimation in the deforestation cost function.
- Updated model calibration. We developed two different scenarios: 1) A “private optimum” that estimates the land conversion schedule when considering benefits and costs of oil palm operations only. This scenario includes taxes and worker wages. 2) A “socially optimal” scenario that estimates land conversion when considering benefits and costs of oil palm operations and ecosystem services and disease (malaria) regulation. Taxes are not included in this scenario because those are simulated from the government’s perspective. Taxes are considered “losses” to businesses but “revenue” to government.
- Initial modeling of the effects of deforestation on Malaria incidence in Sabah at district and state-level. Currently exploring improving the model by choosing more suitable environmental and landscape predictors.
- Presented poster at RSPO (see Progress Narrative for details.)

## 2.2 Implementation Status

- Implementation is on target according to indicators.

## 2.3 Implementation challenges

- UMS bureaucracy and internal politics remains a challenge, however there is progress. While this has not prevented us from achieving main deliverables, it delays issues like enrolling and funding students; and developing a written management plan for DHRU. It does appear that these issues will be primarily be resolved within Q2.
- Although we have made good progress with industry engagement, follow-up meetings are challenging due to busy schedules. DCoP has been unable to get a meeting with Yayasan Sime Darby following last meeting with them at RSPO. Wilmar did not send the application form for requesting access and support to work on Ribubonus plantation until December 10<sup>th</sup> and (b)(6) from P&G did not respond to follow up emails regarding meeting until December 21<sup>st</sup>. We will remain vigilant with outreach.
- Recognizing that Industry partners struggle to attend stakeholder meetings in Sabah and even in KL, one-on-one meetings with specific industry partners and piggy-backing IDEEAL meetings at other events they are attending (e.g. RSPO) has facilitated industry engagement.
- We also learned that local communities are not comfortable attending formal stakeholder meetings at DHRU, but targeting engagement in the communities themselves with the toolkit and health talks, or through events like the Toolkit training with PACOS in a setting the community representatives are comfortable which has been productive.



## **The Establishment of the Development and Health Research Unit**

### **Evaluation of the Development Health and Research Unit**

#### **Current performance**

- The progress of the DHRU towards its IR outputs are included in the Quarterly reports and specific activities and updates are reported in narrative form. In general, the DHRU has made considerable progress towards its primary goals based on Output Indicators 2.1 a-c (see M&E Figure 2) in that it is a functional Unit housed at UMS, has hosted multiple stakeholder meetings, conferences and seminars; all in alignment with the aims of IDEEAL and objectives for the DHRU. We have selected three graduate students who will complete their studies through the DHRU, which was also a stated aim. The delays in establishing the DHRU have meant that we've primarily tracked progress against the table of outputs provided in the quarterly reports and in the narratives. The University Vice Chancellor has expressed commitment to elevate the status of the DHRU from a Unit to a University Center, and we have meetings scheduled for Q3 to further discuss what will be required to meet these aims and formal endorsement from the VC. In Q3, we will focus on drafting a constitution for the DHRU, with input from faculty, and moving forward to meet criteria for becoming a Center at the University, which comes with financial commitments from UMS's central budget. We expect to learn more about this in meetings that will take place in Q3. The following is a summary of progress against specific DHRU assessment areas as stated in the M&E document (Table 2):  
Organizational Capacity Assessment Areas.
- *Governance, vision and mission:* The DHRU has faculty who have been named by their department to be affiliated with the Unit. (b)(6) and serves as our primary PoC for organizing activities through the DHRU. In Y3, we will move forward with drafting a written constitution for the DHRU, with input from faculty advisors, that details leadership, governance, and evaluation.
- *Administration:* During stakeholder meetings, we have formed committees from DHRU faculty to work on toolkit development and planning seminars. We have agreement from DHRU faculty to supervise three Masters' students who will study within the DHRU. We are working with UMS central administration to establish a mechanism for funding the students through an IDEEAL subaward. We are also acquiring information from administration about how the DHRU may become a Center, which will change the way that it is currently administered under the EcoCenter.
- *Program Management:* The DHRU's programs and activities have been consistent with the aims of IDEEAL, and working groups within the Unit have begun to coalesce around specific activities such as toolkit development and seminar planning/coordination. (b)(6) (b)(6) remains the DHRU director and central point of contact, but we have health engagement from medical and economics faculty. We have begun community outreach by meeting with indigenous communities to pilot the land use and health toolkit, and we are planning more trainings and community level outreach for Q3. Outreach to industry partners is ongoing, and we've scheduled follow-up meetings in Q3 with potential industry partners who have expressed interest in using the IDEEAL model to evaluate

their land use. We will aim to link industry engagement to the DHRU either by having representatives from industry present at symposia or other events, or by extending the DHRU to hold small, targeted meetings in KL that make it easier for industry reps to attend. In the second half of Year 3, we anticipate being able to collect meaningful feedback about DHRU value and performance for the end of the project, and in subsequent years beyond the current IDEEAL program period. We will use the OCA plan in our M&E document for guidance in developing a QA evaluation at the end of Y3.

- To date, the DHRU has held seven stakeholder meetings, one public scientific conference on Land Use Change, Health and Economics, and two seminars, also open to the public. Meetings have included faculty and students from multiple departments within UMS (consistently from the FBE and FMHS); from Sabah government agencies (e.g. the Sabah Forestry Department, Sabah Wildlife Department, SEDIA, the Department of State Health Sabah and the Natural Resources Office); local NGOs (e.g. HUTAN, PACOS, LEAP, BCI and WWF); and the IDEEAL technical leads from EHA. We are planning a technical workshop on the use of R statistical software in Q3 and an international symposium on the economics of land use change and health, hosted by UMS, for the end of Q4.
- *Project Performance Management:* The DHRU has met indicators 1-5 listed in the OCA table. Members understand the aims and activities of the Unit; we have successfully worked in collaboration with stakeholders to develop the quantitative model and toolkits; we are sharing updates on toolkits and models with stakeholders and soliciting feedback to assure that we develop high quality products that will be used by public and private sector stakeholders; and we are tracking progress against performance indicators as described in our quarterly reports. We will continue to leverage existing external resources to support DHRU activities (e.g. student research, co-supervision by EHA scientists, collaborative grant writing and publication) beyond the IDEEAL project period, and we continue to seek additional external resources with UMS, and UMS internal funding, to advance the DHRU from Unit to Center, and further expand its profile to make it an international Center of Excellence.
- *External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU; we have begun drafting a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated; we have presented on IDEEAL at 8 international scientific meetings. We've had media engagements, including a reporter from the Sabah Daily Express who joined the CoP and DCoP in Sabah for the stakeholder meetings the week of October 5, 2015. We have provided updates and summaries of IDEEAL to the US Embassy in advance of Secretary of State John Kerry's visit to Malaysia in July, and in advance of President Obama's visit to Malaysia in October. We have also briefed the British High Commissioner.

### **Sustainability**

- The UMS administration recently expressed increased interest in helping elevate the status of the DHRU from being a Unit within an existing center to becoming an independent Center. Our understanding is that once this change is achieved, it will be possible to receive central support from the University to provide administrative and



faculty support, and potentially some budget for programmatic activities. We will further detail this process and our progress in advancing the DHRU in Q3. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU. At the end of Q4, we will hold an international symposium which will also help elevate the profile of the DHRU and should lead to new collaborative opportunities that will contribute to the Center's sustainability.

### Summary

- The progress made in further developing the DHRU, engaging stakeholders, developing the models and toolkits and networking with Sabah government agencies and other NGOs using the DHRU as a forum has allowed us to stay on track for meeting targets as defined in the performance indicators by the end of Y3. While there are definitely areas that will require focused effort in what remains of the project period (e.g. private sector buy-in and use of the model in decision making), we are confident that we have laid the groundwork for effective outreach to these groups, with the help of the government, academic, and NGO stakeholders who have consistently participated in and supported the DHRU and the aims of IDEEAL.

## 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

### 3.1 Gender Equality and Female Empowerment

- (b)(6) serves as the director of the DHRU and is in a position to foster women's participation and leadership in environment and health issues. There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal male/female participation planned for future stakeholder meetings.
- We have enrolled two female and one male student for Masters' degrees through the DHRU.
- A balance male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work towards engaging industry players through MPOC, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in Palm Oil.
- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.

- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby and P&G.
- In discussion with Johnson and Johnson, Colgate and ConocoPhillips about future funding.
- Future targets for industry engagement in Malaysia are Cargill, Mars, McDonald's, Unilever, Nestle and GE.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

Stakeholders continue to be involved in toolkit development, providing input and comments on content and wording.

Submitted application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District. Once application approved we will conduct site visits in early 2016. We have continued engagement with Wilmar and P&G.

Scheduled to meet Johnson & Johnson Sustainability Director responsible for palm sourcing on Jan. 20<sup>th</sup> to discuss collaborating on sustainable palm initiatives.

Scheduled meeting with P&G in Jan. 18th 2016 to discuss partnership and model development with additional data they have on oil palm production and land acquisition.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

#### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE and FMHS regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with PoC at UMS for DHRU, (b)(6) and other faculty, (b)(6) to establish formal agreement to host the DHRU.
- Developing one-page informational handouts describing aspects of IDEEAL program (e.g. modeling, toolkits, DHRU, etc.) to be completed in Q3.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- Presenting toolkit and feedback from HACS to communities of Sukau and Bilit planned for Q2.
- Started conducting IDEEAL Endline Survey with communities of Sukau and Bilit to begin in Q2.
- Presenting toolkit and feedback from HACS to plantations involved in round 1 of HACS in Q2.
- PACOS community facilitator toolkit training planned for February 25<sup>th</sup> and 26<sup>th</sup>.
- Toolkit dissemination to community planned throughout Q2 and Q3.



- Training on the statistical software R planned for UMS February 23<sup>rd</sup> and 24<sup>th</sup>.
- DHRU Research Fellow meeting planned for February 24<sup>th</sup>.
- Meeting planned with DCoP, SCL, and UMS Deputy Vice Chancellor and DHRU leadership to discuss administrative and governance issues, developing the Unit into a Center, and financial mechanism for Masters' student support under IDEEAL subaward.
- Meetings being planned for Y3Q2 with senior staff at SFD, SWD and DSHS to brief them on IDEEAL model and discuss engagement with other senior policy makers not attending stakeholder meetings.

7.1 Required data gathered to run quantitative model

- Conducted literature search for existing studies or valuations of use of degraded land in agricultural production.

7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Continue analysis on factors linking land conversion and disease emergence.

7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will meet with DHRU faculty and begin to develop a written constitution and governance plan for the DHRU.
- Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur; will also finalize mechanism for supporting Masters' students through the DHRU.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and an international symposium in September 2016.

7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Outreach and communications strategy were discussed with stakeholders during October meetings.
- The modeling team met to discuss how to communicate model output to a public audience.
- Toolkit outreach and modification will continue. This includes:
  - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
  - Revising and updating toolkit based on audience feedback.

- Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
- Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
- Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Sabah Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.



**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*

*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

### 4 - Local partners:

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

### 5 - Direct beneficiaries:

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

## **8.4 Milestones**

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. [b](6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by [b](6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved, Y2 Work Plan submitted and approved.



January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work

at the International Symposium on Biodiversity, Agriculture, Environment and Forestry  
in Ooty, India.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 3 Quarter 2 – January 15, 2016 to April 14, 2016

Submission Date: May 31, 2016

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	January 15, 2016 – April 14, 2016



## LIST OF ACRONYMS

AMCHAM	American Malaysian Chamber of Commerce
BAU	Business as Usual
BCI	BC Initiative
BORA	Bornean Rhino Alliance
CoE	Center of Excellence
COC	Community Outreach Coordinator
CoP	Chief of Party
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBEA UMS	Faculty of Business and Economics and Accounting, Universiti Malaysia Sabah
FELDA	Federal Land Development Authority
FHAH UMS	Faculty of Humanities, Art and Heritage, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GDA	Global Development Alliance
GE	General Electric
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
ICU	Intensive Care Unit
IFC	International Finance Corporation
IOI Group	Industrial Oxygen Inc.
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
J&J	Johnson and Johnson Company
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People

## LIST OF ACRONYMS (CONTINUED)

LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MISI	Malaysian Institute for Supply Chain Innovation
MNS	Malaysian Nature Society
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
NMRR	National Medical Research Register
OCA	Organizational Capacity Assessment
P&G	Proctor and Gamble
PACOS Trust	Partners of Community Organisations Sabah Trust
PAWSE	Protective Action for Wildlife in Sabah through Education
PEMANDU	Performance Management and Delivery Unit
PERHILITAN	Department of Wildlife and National Parks Peninsular Malaysia
PL	Policy Lead
PPP	Public Private Partnership
QA	Quality Assurance
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RTM	Radio Television Malaysia
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEARRP	South East Asia Rainforest Research Partnership
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SSHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
VC	Vice Chancellor
TEV	Total Ecosystem Value

TOR	Terms of Reference
VBDC Unit	Vector Borne Disease Control Unit
WHGFL	Wildlife Health, Genetic and Forensic Laboratory
WHO	World Health Organization
WHU	Wildlife Health Unit
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.



Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

Indicators	Year 3				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence’s partners and stakeholders who are able to utilize the model in land-use planning	0%				
External resources support leveraged for sustaining the Center of Excellence operations	0%				
Number of partnerships developed through the Center of Excellence	0				
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	0				
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted					
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- January 18<sup>th</sup> - DCoP met with (b)(6) from P&G to provide more details on IDEEAL project and discuss P&G involvement. P&G may be interested in providing financial support in their next fiscal year. Discussed sharing toolkit with the FELDA plantations they work with, providing additional health education in terms of zoonotic risk from hunting and wildlife contact, (b)(6) agreed to make an introduction to the Performance Management and Delivery Unit (PEMANDU), a unit under the Prime Minister's Department that oversees implementation and assesses progress of the



Economic Transformation Programme and the Government Transformation Programme. Discussed the idea of modeling the economic impact of the haze; P&G interested.

- January 21<sup>st</sup> - DCoP met with SWD to discuss briefing the Minister of Tourism, Culture and Environment on the IDEEAL project.
- January 21<sup>st</sup> - DCoP met with PACOS to discuss plans for Toolkit training on February 25<sup>th</sup> and 26<sup>th</sup>. Expect around 100 participants from 80 communities. Will introduce toolkit to community members and plan to train Community Leaders and PACOS staff to be toolkit facilitators. DCoP also met with (b)(6) from FMHS to discuss web page design for DHRU, R software training planned for February 23<sup>rd</sup> and 24<sup>th</sup> and a supervisor for (b)(6) Masters' student, at DHRU.
- January 21<sup>st</sup> - DCoP met with BCI to discuss final plans for Toolkit meetings and IDEEAL end line survey with the communities of Sukau and Bilit and the plantations involved in the HACS. Discussed plans for HACS in Telupid and time line for completing work.
- January 22<sup>nd</sup> - DCoP met with (b)(6), DVC, Academic and International, (b)(6) FMHS who has agreed to be (b)(6) Masters' supervisor, and (b)(6) from FBEA. Discussed enrollment date for (b)(6) opening the Trust account for DHRU student funds from IDEEAL; contract for sending funds; the need to create a written management plan for DHRU; and the creation of the DHRU website; agreed dates for next DHRU training - R Software training - on 23<sup>rd</sup> and 24<sup>th</sup> February.
- January 30<sup>th</sup> - Toolkit presentation to community of Bilit attended by 39 people.
- January 31<sup>st</sup> - Toolkit presentation to community of Sukau attended by 27 people.
- February 1<sup>st</sup> - Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people.
- February 12<sup>th</sup> - Wilmar informed DCoP of approval to work on Ribubonus plantation and receive support for lodging and food during DF sampling and HACS in Telupid District. Site visit and meetings are planned for March 14-17.
- February 15<sup>th</sup> - DCoP met with Deputy Director SWD to confirm details for meeting with Permanent Secretary to the Minister of Tourism, Culture and Environment to brief him on the IDEEAL project. Meeting planned for March 16<sup>th</sup>.
- February 16<sup>th</sup> - DCoP meets with PACOS to finalize plans for training February 25-26.
- February 21<sup>st</sup> - Toolkit presentation to Suan Lamba Genting Plantation attended by 83 workers.
- February 22<sup>nd</sup> - DCoP, SCL, and (b)(6) (EHA Southeast Asia Science and Policy lead) met with (b)(6) (P&G) and Malaysian Institute for Supply Chain Innovation (MISI); presented IDEAL model; and discussed P&G involvement. P&G agreed to IDEEAL team presenting Land Use Change and Disease Emergence Toolkits to FELDA plantations; P&G request zoonotic disease spillover risk assessment within FELDA system; P&G to provide water purification sachets to local Orang Asli communities; P&G particularly interested in modeling economic impact of haze and may have funding to support this in their next fiscal year. P&G request IDEEAL team to participate in development of educational video for smallholders which will include sustainability, health, safety and environmental topics with 3 other NGOs Pro Forest, Global Forest Watch, and Wild Asia.



- **Policy Dialogue:** February 23<sup>rd</sup> - DCoP, SCL, [b)(6)] and [b)(6)] from HUTAN met with Deputy Director of Sabah Forestry Department; presented IDEEAL model and results. Findings well received and how to address problems land over-conversion discussed. SFD want to use model to justify improving efficiency/yield on current plantations rather than clearing more land. Discussed preparing summary of IDEEAL and other relevant research on carbon sequestration, catchment areas, wildlife movements, land marked for clearing that is too water logged to support oil palm, etc. to serve as a blueprint for Sabah land planning (indicating which land should be protected, converted back, and developed). IDEEAL team is discussing with HUTAN, LiLA and DGFC.
- February 23<sup>rd</sup> - IDEEAL team reviewed projects with 3 DHRU students and UMS supervisors.
- February 23<sup>rd</sup> - 24<sup>th</sup> IDEEAL conducted R Software training at FMHS UMS - Introduction to R, and using R for statistical analyses. Attended by 26 people: the 3 DHRU students, 2 PACOS staff members, student and staff from faculties FMHS, FBEA and FHAH.
- February 24<sup>th</sup> - DHRU Management meeting DCoP, SCL, and IDEEAL team, [b)(6)] [b)(6)] DVC, [b)(6)] FBEA, and a lawyer from UMS. Discussed contract, funding mechanism for students, enrollment, management plan and structure and DHRU advancing to become a Center at UMS.
- February 24<sup>th</sup> - DHRU Research Fellow Meeting. DCoP, SCL, and IDEEAL team met with 8 research fellows from 4 faculties. Discussed DHRU management committee and Director as a rotating position. VC to make all final decisions; committee from EHA and UMS; each faculty must be represented by at least 1 person; person(s) to be appointed later in the year; [b)(6)] to provide copy of management plan from another center to facilitate management plan development. Once management plan is drafted, DHRU can be considered for promotion to Center under FBEA and FMHS with an office at FMHS. Target website completion and management plan draft by end of March. Training: additional R workshop planned; seminars on grant writing; special issue of EcoHealth Journal devoted to land-use change and its related economic and health issues proposed.
- **Policy Dialogue:** February 25<sup>th</sup> - DCoP met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. SWD wants to establish a risk management committee for staff health. Director wants IDEEAL model to be presented to Minister of Tourism Culture and Environment; believes it's useful for planning of development projects in Sabah and could help with current debate over the location of a bridge across the Kinabatangan planned for Sukau that would divide the Kinabatangan wildlife sanctuary in half. SWD Director agreed to join DCoP and Permanent Secretary for March 16<sup>th</sup> meeting.
- February 25<sup>th</sup> - 26<sup>th</sup> Toolkit training with PACOS, attended by 109 people from 45 communities. Awareness talk on land-use change, links between land-use change and health and introduction of diseases/outbreaks in Malaysia and Sabah. Administered group activities: identify how gender and age groups can differ in how land is used; the different behaviors in their own healthcare, and role-playing in a community setting; identifying which of the four animals (orangutan, elephant, monitor lizard or hornbill) participants are best associated with; and practicing the toolkit presentation with assigned conditions



for participants as challenges to presenters. After each activity, participants were given the opportunity to present their groups' responses.

- March 1<sup>st</sup> - DCoP contacted PEMANDU.
- **Policy Dialogue:** March 14<sup>th</sup> - DCoP met with Director and senior staff from Sabah State Health Department including Director of their Centre for Disease Control, and presented Human Animal Contact Survey findings, PREDICT disease screening and the IDEEAL model. SSHD plan to use HACS report and IDEEAL model to leverage plantation involvement in funding clinics for plantation workers. SSHD finds HACS useful for planning health care interventions; interested in Telupid findings.
- March 14<sup>th</sup> - DCoP met with Director from Radio Television Malaysia to discuss TV show on RTM featuring IDEEAL.
- March 14<sup>th</sup> - DCoP met with PACOS; discussed toolkit dissemination in communities. Community leaders and PACOS staff are not yet comfortable facilitating toolkit. IDEEAL team to run a second training with a smaller group of approximately 50 PACOS staff and community leaders. Trainers will travel to interested communities and facilitate presentation by leaders in July/August.
- **Policy Dialogue:** March 16<sup>th</sup> - DCoP met with (b)(6) presented IDEEAL model and PREDICT findings and HACS results. (b)(6) agreed model very useful for development planning; requested DCoP to present findings to Minister. Meeting planned for March 21<sup>st</sup>.
- March 16-18 - DCoP visited Wilmar Ribubonus plantation in Telupid; discussed next round of HACS and DEEP FOREST. Wilmar to provide staff house and food for sampling teams. Plantation staff will participate in HACS and receive Toolkit presentation.
- March 17<sup>th</sup> - RTM interviews (b)(6) about IDEEAL and PREDICT; films lab work.
- **Policy Dialogue:** March 21<sup>st</sup> - DCoP met with (b)(6) presented IDEEAL model and PREDICT HACS results. (b)(6) agreed model is important for Sabah's development planning. He advises that best way forward is to prepare a position paper to be presented to the Sabah Cabinet and to arrange a time for DCoP to meet with (b)(6) to present the model. (b)(6) feels that if we can convince Chief Minister of the importance of the model and the need to consider the impact of land-use change in terms of disease emergence when planning development projects, then heads of all government departments in Sabah will have to pay attention and adopt such practices into their land-use change decisions.
- March 31<sup>st</sup> - DCoP follows-up with PEMANDU through email and calls (b)(6) regarding P&G confidentiality agreement.
- April 1<sup>st</sup> - (b)(6) from Palm Oil & Rubber NKEA, Investment & Innovation, Economic Transformation Programme at PEMANDU contacts DCoP informing him that too busy for meeting in immediate future, but will be in touch when their schedule is clearer and offers to put DCoP in touch with ministry officials involved in land-use change.



- April 6<sup>th</sup> - DCoP meets with SWD to discuss position paper for Cabinet. SWD will provide an example that DCoP can use as draft in accordance with Sabah Cabinet regulations.
- April 6<sup>th</sup> - DCoP meets with (b)(6) DVC and (b)(6) DHRU. (b)(6) agrees for UMS logo to appear on 1 page briefers, DCoP is informed that contract has been approved and will be signed by April 8<sup>th</sup>. A signing ceremony will be held later in the month. Agree to meeting at end of month to prepare management plan.
- April 7<sup>th</sup> - DCoP and (b)(6) give interview to RTM about IDEEAL and PREDICT work. TV crew film DEEP FOREST sampling.
- April 13<sup>th</sup> - (b)(6) gives talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching.

#### 2.1.1 Toolkit Development

- January 30<sup>th</sup> - Toolkit presentation to community of Bilit attended by 39 people.
- January 31<sup>st</sup> - Toolkit presentation to community of Sukau attended by 27 people.
- February 1<sup>st</sup> - Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people
- February 21<sup>st</sup> - Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.
- 2-day Toolkit training held in February:
  - Working with PACOS to introduce toolkit to communities and train community members and PACOS staff as toolkit facilitators;
  - 109 participants from 45 communities participated in workshop.

#### 2.1.2 Modeling Activities

- Ran simulations with different connectivity thresholds and refined both high and low connectivity scenario maps for Sabah.

### 2.2 Implementation Status

- Implementation is on target according to indicators.

### 2.3 Implementation challenges

- The former JKK (appointed by District Officer to be joint head of Village Security and Development Committee) for the community of Sukau undermined the IDEEAL project's efforts to engage with the community. As a result, the community meeting on January 31<sup>st</sup> was not well attended. During preparations for the meeting, we visited JKK to get permission for the meeting and to seek his assistance with informing the community. He did not inform us that he was no longer JKK and tried to use the meeting as an opportunity to re-secure his position from the District Officer at Kinabatangan. When we met with the KK (Village Chief), a week before the meeting, he informed us that the JKK had not had his position renewed and that he had not informed anyone else about the meeting. Unfortunately, it was too late at that stage to not involve the former



JKK. Most villagers avoided the meeting as they are distancing themselves from the former JKK.

- (b)(6) has not sent confidentially agreement, which is delaying progress with P&G. DCoP to follow up in Q3.
- PEMANDU have not found time to meet DCoP or put him in touch with ministry officials. DCoP to continue to follow up in Q3.
- UMS took 3 months to review latest version of contract with EHA, delaying the process of student research. DCoP to continue to follow up in Q3.
- UMS provided inaccurate instructions to DHRU students about enrollment, delaying start. On April 4<sup>th</sup>, (b)(6) dropped out as academic advisor for (b)(6). (b)(6) is seeking a new advisor.
- Management plan and website development delayed. SCL and DCoP to follow up with Research Fellows regarding DHRU management plan format and seminar schedule.

## 2.4 M&E Update

### **The Establishment of the Development and Health Research Unit**

### **Evaluation of the Development Health and Research Unit**

#### **Current performance**

- The progress of the DHRU towards its IR outputs are included in the Quarterly reports and specific activities and updates are reported in narrative form. In general, the DHRU has made considerable progress towards its primary goals based on Output Indicators 2.1 a-c (see M&E Figure 2) in that it is a functional Unit housed at UMS, has hosted multiple stakeholder meetings, conferences and seminars; all in alignment with the aims of IDEEAL and objectives for the DHRU. The three graduate students have identified projects and academic advisors. (b)(6) has agreed to serve as the IDEEAL team advisor to all three students and is proactively meeting with them both virtually and at UMS. The University Vice Chancellor is still committed to creating a Center, and in Q3 the DHRU Directorship will formally change from (b)(6) (Business School) to (b)(6) (Medical Faculty), which we anticipate will prompt forward progress. We have meetings scheduled for Q3 to further discuss what will be required to meet these aims and formal endorsement from the VC. In Q3, we will focus on drafting a constitution for the DHRU, with input from faculty, and moving forward to meet criteria for becoming a Center at the University, which comes with financial commitments from UMS's central budget. We expect to learn more about this in meetings that will take place in Q3. The following is a summary of progress against specific DHRU assessment areas as stated in the M&E document (Table 2): Organizational Capacity Assessment Areas.
- *Governance, vision and mission:* The VC and current DHRU Director have agreed that the position of Director will be a 2-year rotating position, and a new Director will be appointed in Q3 (b)(6). The Director of the DHRU will remain IDEEAL team's primary PoC for organizing activities through the DHRU. In Q3, we will move forward with drafting a written constitution for the DHRU, with input from faculty advisors, that details leadership, governance, and evaluation.



- *Administration:* The DHRU has established working groups composed of UMS faculty to work on toolkit development, the DHRU management and planning seminars. We have identified DHRU Faculty to supervise three Masters' students who will enroll via the DHRU. We are finalizing a contract with UMS to establish a mechanism for funding students. We are also acquiring additional information from administration as to how the DHRU may become a Center and receive UMS funding.
- *Program Management:* The DHRU's programs and activities have been consistent with the aims of IDEEAL, and working groups within the Unit have begun to coalesce around specific activities such as toolkit development and seminar planning/coordination. (b)(6) (b)(6) will step down as DHRU Director and (b)(6) will rotate into the position for the next 2 years. We have begun community outreach by meeting with indigenous communities to pilot the land-use and health toolkit, and we are planning more trainings and community level outreach for Q3. Outreach to industry partners is ongoing, and we've scheduled follow-up meetings in Q3 with potential industry partners who have expressed interest in using the IDEEAL model to evaluate their land use. We will aim to link industry engagement to the DHRU either by having representatives from industry present at symposia or other events, or by extending the DHRU to hold small, targeted meetings in KL that make it easier for industry representatives to attend. In the second half of Year 3, we anticipate being able to collect meaningful feedback about DHRU value and performance for the end of the project, and in subsequent years beyond the current IDEEAL program period. We will use the OCA plan in our M&E document for guidance in developing a QA evaluation at the end of Y3.
- To date, the DHRU has held seven stakeholder meetings, one public scientific conference on Land Use Change, Health and Economics, two seminars, also open to the public, and one technical workshop open for UMS faculty and students. Meetings have included faculty and students from multiple departments within UMS (consistently from the FBE and FMHS); from Sabah government agencies (e.g. the Sabah Forestry Department, Sabah Wildlife Department, SEDIA, the Department of State Health Sabah and the Natural Resources Office); local NGOs (e.g. HUTAN, PACOS, LEAP, BCI and WWF); and the IDEEAL technical leads from EHA. We are planning another technical workshop on the use of R statistical software in Q3 and are encouraging DHRU students to submit abstracts to the EcoHealth/One Health Congress in Melbourne, Australia, December 2016.
- *Project Performance Management:* The DHRU has met indicators 1-5 listed in the OCA table. Members understand the aims and activities of the Unit; we have successfully worked in collaboration with stakeholders to develop the quantitative model and toolkits; we are sharing updates on toolkits and models with stakeholders and soliciting feedback to assure that we develop high quality products that will be used by public and private sector stakeholders; we have held several policy meetings with Sabah ministry officials who have indicated an interest in presenting the IDEEAL model to State planning agencies and a white paper at an upcoming Cabinet meeting. We are tracking progress against performance indicators as described in our quarterly reports. We will continue to leverage existing external resources to support DHRU activities (e.g. student research, co-supervision by EHA scientists, collaborative grant writing and publication) beyond the IDEEAL project period, and we continue to seek additional external resources with UMS,



and UMS internal funding, to advance the DHRU from Unit to Center, and further expand its profile to make it an international Center of Excellence.

- *External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have begun drafting a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated; we have presented on IDEEAL at 8 international scientific meetings. We've had media engagements, including being interviewed for a TV piece produced by RTM.

### **Sustainability**

- The UMS administration continues to assert its interest in helping elevate the status of the DHRU from being a Unit within an existing center to becoming an independent Center. Our understanding is that once this change is achieved, it will be possible to receive central support from the University to provide administrative and faculty support, and potentially some budget for programmatic activities. We will further detail this process and our progress in advancing the DHRU in Q3. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU. At the end of Q4, we will hold an international symposium which will also help elevate the profile of the DHRU and should lead to new collaborative opportunities that will contribute to the Center's sustainability.
- We have met with private sector stakeholders such as Proctor & Gamble, who have expressed interest in collaborating with and supporting IDEEAL activities beyond the current period of performance; we are also in discussions with J&J and Colgate Palmolive.

### **Summary**

- The progress made in further developing the DHRU, engaging stakeholders, developing the models and toolkits, holding policy dialogues with Sabah government agencies and other NGOs, and using the DHRU as a forum and avenue for student research has allowed us to stay on track for meeting targets as defined in the performance indicators by the end of Y3. While there are definitely areas that will require focused effort in what remains of the project period (e.g. private sector buy-in and use of the model in decision making), we are confident that we have laid the groundwork for effective outreach to these groups, with the help of the government, academic and NGO stakeholders who have consistently participated in and supported the DHRU and the aims of IDEEAL.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- (b)(6) currently serves as the Director of the DHRU and (b)(6) (b)(6) (incoming Director) are in a position to foster women's participation and leadership in environment and health issues. There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal male/female participation planned for future stakeholder meetings.
- We have enrolled two female and one male student for Masters' degrees through the DHRU.
- A balance male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby and P&G.
- In discussion with Johnson and Johnson, Colgate and ConocoPhillips about future funding.
- Future targets for industry engagement in Malaysia are Cargill, Mars, McDonald's, Unilever, Nestle and GE.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Stakeholders continue to be involved in toolkit development, providing input and comments on content and wording.
- PACOS and BCI are fully engaged in toolkit dissemination plan, with facilitators trained and additional trainings planned.
- Submitted application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District. Application approved. Site visit conducted March 16-18. Human Animal Contact Survey in Telupid scheduled to start June 14<sup>th</sup>. DEEP FOREST sampling in Telupid scheduled to start in July. We have continued engagement with Wilmar and P&G.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.



## 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE and FMHS regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with PoC at UMS for DHRU, (b)(6) and other faculty, (b)(6) to establish formal agreement to host the DHRU.

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

- IDEEAL team is developing one-page informational handouts focused on the following aspects of IDEEAL including: overview, economic modeling, community outreach, scientific capacity strengthening and policy impact. The sheets will be completed in Q3 and will be distributed mid-May to assist in securing funding to continue the project.

### 7.1 Required data gathered to run quantitative model

- Conducted literature search for existing studies or valuations of use of degraded land in agricultural production.

### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Continue analysis on factors linking land conversion and disease emergence.

### 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.
- Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur; will also finalize mechanism for supporting Masters' students through the DHRU.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and participation in the EcoHealth/One Health Congress in Melbourne, Australia 2016.
- Will conduct additional introductory and advanced R software and training workshops at UMS over next two quarters.

### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Outreach and communications strategy were discussed with stakeholders during October meetings.
- The modeling team met to discuss how to communicate model output to a public audience.
- Toolkit outreach and modification will continue. This includes:

- Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
- Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
- Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
- Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
- Working with stakeholders to conduct toolkit sessions in communities throughout Sabah.
- Training additional community members as toolkit facilitators.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

Last November, EHA became a member of the Roundtable on Sustainable Palm Oil (RSPO) and sponsored a booth detailing our work in Sabah with scientists fielding questions from various stakeholders including government, industry, and NGOs. EHA continues to leverage industry contacts to assist in increasing the awareness of our work by presenting at the conference this year.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive



**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Sabah Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company. .*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*

*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

### 4 - Local partners:

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### **8.4 Milestones**

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.



December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference "Links between Land Change, Development and Health" held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.



April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 3 Quarter 3 – April 15, 2016 to July 14, 2016

Submission Date: August 31, 2016

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	April 15, 2016 – July 14, 2016



## LIST OF ACRONYMS

ADO	Assistant District Officer
AMCHAM	American Malaysian Chamber of Commerce
BAU	Business as Usual
BCI	BC Initiative
BORA	Bornean Rhino Alliance
CoE	Center of Excellence
COC	Community Outreach Coordinator
CoP	Chief of Party
Co-PI	Co-Principal Investigator
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
EPU	Economic Planning Unit
FAO	Food and Agriculture Organization
FBEA UMS	Faculty of Business and Economics and Accounting, Universiti Malaysia Sabah
FELDA	Federal Land Development Authority
FHAH UMS	Faculty of Humanities, Art and Heritage, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
FSNR	Faculty of Science and Natural Resources
GDA	Global Development Alliance
GE	General Electric
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HIA	Health Impact Assessment
ICU	Intensive Care Unit
IFC	International Finance Corporation
IOI Group	Industrial Oxygen Inc.

## LIST OF ACRONYMS (CONTINUED)

IR	Indicator Reference
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
J&J	Johnson and Johnson Company
KL	Kuala Lumpur
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MISI	Malaysian Institute for Supply Chain Innovation
MNS	Malaysian Nature Society
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
NMRR	National Medical Research Register
OCA	Organizational Capacity Assessment
P&G	Proctor and Gamble
PACOS Trust	Partners of Community Organisations Sabah Trust
PAWSE	Protective Action for Wildlife in Sabah through Education
PEMANDU	Performance Management and Delivery Unit
PERHILITAN	Department of Wildlife and National Parks Peninsular Malaysia
PL	Policy Lead
PPP	Public Private Partnership
QA	Quality Assurance
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
RTM	Radio Television Malaysia
SaBC	Sabah Biodiversity Council
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEARRP	South East Asia Rainforest Research Partnership
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SSHD	Sabah State Health Department

## LIST OF ACRONYMS (CONTINUED)

SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
UPEN	Sabah Economic Unit
USAID	United States Agency for International Development
USGS	United States Geological Survey
VC	Vice Chancellor
TEV	Total Ecosystem Value
TOR	Terms of Reference
VBDC Unit	Vector Borne Disease Control Unit
WHGFL	Wildlife Health, Genetic and Forensic Laboratory
WHO	World Health Organization
WHU	Wildlife Health Unit
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby

## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.



Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning

## 1.2 Summary of Results to Date

Indicators	Year 3				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence’s partners and stakeholders who are able to utilize the model in land-use planning	0%				
External resources support leveraged for sustaining the Center of Excellence operations	0%				
Number of partnerships developed through the Center of Excellence	0				
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	0				
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted					
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- April 20<sup>th</sup> DCoP discusses IDEEAL work at MyHOUN training with staff from Ministry of Health, Department of Wildlife and National Parks, Department of Veterinary Services and staff from local universities.
- April 22<sup>nd</sup> UMS provided feedback on student funds contract from UMS legal department.
- May 24<sup>th</sup> EHA addressed students funds contract.



- May 24<sup>th</sup> - DCoP met with District Officer for Telupid to discuss conducting HACS in Telupid.
- May 24<sup>th</sup> - DCoP and (b)(6) at Wilmar to finalize plans for HACS and toolkit presentation with staff and workers at the Ribubonus Plantation.
- May 25<sup>th</sup> - DCoP met with (b)(6) Masters' program and identify new supervisor. (b)(6) notes that she will not continue as Head of DHRU after May; (b)(6) agreed to become Head in June. DCoP and (b)(6) discussed the DHRU website - DCoP to share template with FMHS IT staff who will prepare draft of pages to go on UMS and EHA websites. Due to lack of response from DHRU Research Fellow on R Software training, DCoP and (b)(6) planned to hold second introductory R training on 18<sup>th</sup> and 19<sup>th</sup> of August 2016.
- May 26<sup>th</sup> - DCoP met with (b)(6), DVC, and (b)(6) agrees to (b)(6) as new Head of the DHRU. DCoP is informed that contract for student funding will be signed the following week. Agree that on July 18<sup>th</sup>, a contract signing ceremony will be held, as well as a meeting with all DHRU Research Fellows to address misunderstandings on the management of the DHRU and the respective roles of UMS and EHA in this collaboration. (b)(6) agrees to speak with staff from FMHS and FSNR who had been impeding enrollment of DHRU students.
- July 14<sup>th</sup> - A second meeting will be held with DHRU students and their supervisors to resolve outstanding enrollment issues for (b)(6) and discuss work plans and timelines.
- On the 18<sup>th</sup> - It is also agreed that CoP will give a seminar on Grant Writing and Fundraising. It is agreed that (b)(6) supervisor from FMHS, and that DCoP and (b)(6) will identify a microbiologist to be the second UMS supervisor. The website and management plan are discussed. (b)(6) will provide example of management plan for DCoP and SCL to use to prepare first draft.
- June 7<sup>th</sup> - DCoP meets with (b)(6) - certain staff from FMHS continue to impede (b)(6) enrollment. (b)(6) has identified (b)(6) from the Biotechnology Research Institute as an alternative supervisor. (b)(6) is having similar problems with her enrollment at FSNR; (b)(6) has agreed to be (b)(6) supervisor, but the faculty is impeding her registration. (b)(6) will look into this and DCoP will follow-up with (b)(6) has been told contract will be ready by following week. IT staff from FMHS are in process of creating web page for DHRU. (b)(6) following-up on process for students to access funds once contract is signed.
- June 7<sup>th</sup> - DCoP and (b)(6) met with (b)(6) to discuss (b)(6) Masters' Program; (b)(6) agreed to be (b)(6) second UMS supervisor. DCoP to provide more details about DHRU and IDEEAL, and PREDICT.
- June 7<sup>th</sup> - DCoP met with PACOS to discuss next round of training. Planned for 15<sup>th</sup> - 18<sup>th</sup> August. Expected approximately 50 participants at second training at PACOS with PACOS staff and Community Liaisons who are interested in learning how to facilitate toolkit from 15-16. On August 17<sup>th</sup>, traveled to Kampong Kalampun in Murat. On August 18<sup>th</sup>, Community Liaisons from Kampong to present toolkit with assistance from (b)(6) (b)(6) COC. This is a great opportunity to see how the facilitators handle the toolkit and how the community responds when hearing from one of their own,



expected around 500 people. PACOS requests Bahasa Malaysia translations of one page briefers made into posters.

- June 10<sup>th</sup> - (b)(6) met with Assistant District Officer at Telupid to confirm start dates for HACS and DF sampling in Telupid. But the ADO (despite permission being previously granted by District Office to carry out HACS and DF sampling in Telupid) will not allow HACS to start until he sees approval letters from Economic Planning Unit (EPU) and Sabah Economic Planning Unit (UPEN).
- June 10<sup>th</sup> - (b)(6) contacts UPEN who claim to know nothing about EHA work in Sabah. DCoP contacts EPU who admit to not informing UPEN of work in Sabah. SWD also have not fulfilled their responsibility of notifying UPEN and Sabah Biodiversity Council (SaBC). DCoP and (b)(6) work with EPU, UPEN and SaBC to resolve these issues.
- June 15<sup>th</sup> - EPU and UPEN issue letters required for HACS to continue. Deep Forest Sampling in Telupid will be on hold until SaBC permit is issued at end of August, but can continue as planned in Kinabatangan.
- June 22<sup>nd</sup> - UMS return draft of contract with final edits and details of new bank account for DHRU funds. EHA send back signed copy the same day.
- June 28<sup>th</sup> - (b)(6) met again with ADO who reviewed all the paper work. He was very supportive of HACS and has asked village leaders to be supportive of our efforts.
- June 29<sup>th</sup> - UMS return signed contract. Official signing ceremony still planned for July 18<sup>th</sup>.
- June 30<sup>th</sup> - DCoP meets with (b)(6) for SSHD and (b)(6) on HACS, to update him on delays and discuss presenting cabinet paper and briefing Chief Minister on IDEEAL project who (b)(6) has a good relationship.
- June 30<sup>th</sup> - DCoP and (b)(6) met with SSHD to discuss delays to HACS in Telupid and new timeline for completion. SSHD agreed to provide details on the cost of preventing and educating people on Malaria risk to add to model.
- July 11-13<sup>th</sup> - (b)(6) and BCI carry out community meetings at Kampongs - Ansuang, Buis, Baba and the Wilmar Ribubonus Plantation, informing people of PREDICT and IDEEAL work, the HACS, and presenting the toolkit.
- July 13<sup>th</sup> - HACS starts in Telupid. BCI should enroll and sample 450 people by early August with data entry completed by the end of same month.
- July 14<sup>th</sup> - DCoP presents IDEEAL work to GHSD group at RDMA Bangkok.
- July 14<sup>th</sup> - (b)(6) met with DHRU students and their supervisors.

### 2.1.1 Toolkit Development

- July 10<sup>th</sup> - Toolkit presentation to the 6 field researchers from BCI who are conducting HACS.
- July 11<sup>th</sup> - Toolkit presentation to 45 villagers from Kampung Ansuang, in Telupid.
- July 11<sup>th</sup> - Toolkit presentation to 10 villagers from Kampung Buis, in Telupid.
- July 12<sup>th</sup> - Toolkit presentation to 15 villagers from Kampung BaBa, in Telupid.
- July 13<sup>th</sup> - Toolkit presentation to 5 staff from Wilmar Ribubonus Plantation.



- Since September 2015 in Malaysia, we have presented tollkits to 554 people from IOI Morisem Plantation, Genting Plantation, Yu Kwang Plantation, Sepagaya Plantation, Genting Suan Lamba oil palm plantation, Wilmar and staff at their Ribubonus Plantation, Sime Darby, Yayasan Sime Darby, Coca Cola, Malaysian Palm Oil Council, American Chamber of Commerce, American Embassy, Johnson and Johnson National Public Health Laboratory, Yayasan IAR Indonesia and 50 communities across Sabah.
- Toolkit facilitation training and more community and industry outreach planned for Q4.

### 2.1.2 Modeling Activities

- The economic model was originally developed in Matlab, a proprietary software that includes several algorithms and libraries necessary to run econometric models. During the past quarter, the modeling work has been focused on the development of an open source version of the economic model mainly reducing the time necessary to solve the equations. A number of programming languages were explored: R, Octave, Julia, and Fortran.
- Coded dynamic economic model in Fortran programming language, which is open source. Fortran was chosen because programs can run on multiple computer cores, allowing for use of large (high resolution) spatial data in determining land use scenarios at greater computational speed. Model output is now in a generic format, so that analysis and mapping of results can be performed in another open source program.
- Handling spatial data is computationally expensive, particularly as the size of the spatial data is scaled up (fine spatial resolution). To minimize this problem, we explored alternative methods to cut down computational time. Began writing of scientific manuscripts that will be submitted for review within the next quarter.
- Developed and created a website ([redcap.ecohealthalliance.org](http://redcap.ecohealthalliance.org)) to enter data generated by the Deep Forest Human Animal Contact Survey (see Appendix).

### Implementation Status

- Implementation is on target according to indicators.

### 2.2 Implementation challenges

- Limited data availability in Sabah (demographic, industry, and epidemiological) makes estimating parameters needed to run the model difficult. Faster computational timing using Fortran allows for exploration of a wider range of parameterizations and assumptions.

### 2.3 M&E Update

#### **The Establishment of the Development and Health Research Unit**

#### **Evaluation of the Development Health and Research Unit**



## Current performance

- The progress of the DHRU towards its IR outputs are included in the Quarterly reports and specific activities and updates are reported in narrative form. In general, the DHRU has made considerable progress towards its primary goals based on Output Indicators 2.1 a-c (see M&E Figure 2) in that it is a functional Unit housed at UMS, has hosted multiple stakeholder meetings, conferences, seminars and training workshops; all in alignment with the aims of IDEEAL and objectives for the DHRU. The three graduate students have now enrolled and have projects and academic advisors. A contract has been signed by the CoP and UMS ensuring funding for the student research projects. The University Vice Chancellor has confirmed that a new director will rotate in to lead the DHRU (b)(6) (b)(6) which we anticipate will prompt forward progress. We have drafted a constitution for the DHRU, a necessary step towards promoting it to a Center of Excellence. The draft constitution was submitted to the Vice Chancellor for review. In Q4, we will move forward to meet criteria for becoming a Center at the University, which comes with financial commitments from UMS' central budget. The following is a summary of progress against specific DHRU assessment areas as stated in the M&E document (Table 2): Organizational Capacity Assessment Areas.
- *Governance, vision and mission:* The VC and current DHRU Director have agreed that the position of Director will be a 2-year rotating position. A new Director has been appointed (b)(6). The Director of the DHRU will remain the IDEEAL team's primary PoC for organizing activities through the DHRU. A constitution and management plan for the DHRU was drafted and submitted to the Vice Chancellor for review.
- *Administration:* The DHRU has established working groups composed of UMS faculty to work on toolkit development, the DHRU management and planning seminars. Three Masters' students have enrolled via the DHRU. We have signed a contract with UMS to establish a mechanism for funding students.
- *Program Management:* The DHRU's programs and activities have been consistent with the aims of IDEEAL, and working groups within the Unit have begun to coalesce around specific activities such as toolkit development and seminar planning/coordination. (b)(6) (b)(6) will rotate into the position of DHRU Director for the next 2 years. We have continued community outreach by meeting with indigenous communities with PACOS to pilot the land-use and health toolkit. Outreach to industry partners is ongoing, and we've met with private sector companies who have expressed interest in using the IDEEAL model to evaluate their land use. We will aim to link industry engagement to the DHRU either by having representatives from industry present at symposia or other events, or by extending the DHRU to hold small, targeted meetings in KL that make it easier for industry representatives to attend. In Q4, we anticipate being able to collect meaningful feedback about DHRU value and performance for the end of the project, and in subsequent years beyond the current IDEEAL program period. We will use the OCA plan in our M&E document for guidance in developing a QA evaluation at the end of Y3.
- To date, the DHRU has held eight stakeholder meetings, one public scientific conference on Land Use Change, Health and Economics, two seminars, also open to the public, and two technical workshops open for UMS faculty and students. Meetings have included

faculty and students from multiple departments within UMS (consistently from the FBE and FMHS); from Sabah government agencies (e.g. the Sabah Forestry Department, Sabah Wildlife Department, SEDIA, the Department of State Health Sabah and the Natural Resources Office); local NGOs (e.g. HUTAN, PACOS, LEAP, BCI and WWF); and the IDEEAL technical leads from EHA. We are planning another technical workshop on the use of R statistical software in Q3 and are encouraging DHRU students to submit abstracts to the One Health Congress and Biennial Congress of the International Association for Ecology and Health in Melbourne, Australia, December 3-7, 2016. In November 2016, we plan to give a talk at the RSPO Annual Meeting and organize a side event to promote the IDEEAL project and attract additional stakeholders who may wish to support and utilize the model or toolkits developed.

- *Project Performance Management:* The DHRU has met indicators 1-5 listed in the OCA table. Members understand the aims and activities of the Unit; we have successfully worked in collaboration with stakeholders to develop the quantitative model and toolkits; we are sharing updates on toolkits and models with stakeholders and soliciting feedback to assure that we develop high quality products that will be used by public and private sector stakeholders; we have held several policy meetings with Sabah ministry officials who have indicated an interest in presenting the IDEEAL model to State planning agencies and a white paper at an upcoming Cabinet meeting. We are tracking progress against performance indicators as described in our quarterly reports. We will continue to leverage existing external resources to support DHRU activities (e.g. student research, co-supervision by EHA scientists, collaborative grant writing and publication) beyond the IDEEAL project period, and we continue to seek additional external resources with UMS, and UMS internal funding, to advance the DHRU from Unit to Center, and further expand its profile to advance it to an international Center of Excellence.
- *External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have begun drafting a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated; we have presented on IDEEAL at 8 international scientific meetings. We have submitted an abstract to speak at the One Health Congress and Biennial Congress of the International Association for Ecology and Health in Melbourne, Australia, in December 2016. We've had media engagements, including being interviewed for a TV piece produced by RTM.

## **Sustainability**

- The UMS administration continues to assert its interest in helping elevate the status of the DHRU from being a Unit within an existing center to becoming an independent Center. Our understanding is that once this change is achieved, it will be possible to receive central support from the University to provide administrative and faculty support, and potentially some budget for programmatic activities. We will further detail this process and our progress in advancing the DHRU in Q4. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise



students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU.

- We have met with private sector stakeholders such as Proctor & Gamble, who have expressed interest in collaborating with and supporting IDEEAL activities beyond the current period of performance; we are also in discussions with J&J and Colgate Palmolive. A proposal for an additional 3 years of support was requested and submitted to Johnson & Johnson and is in review. The CoP and SCL met with USAID Climate Change group in Washington, DC to present an update of IDEEAL activities.

## Summary

- The progress made in further developing the DHRU, engaging stakeholders, developing the models and toolkits, holding policy dialogues with Sabah government agencies and other NGOs, and using the DHRU as a forum and avenue for student research has allowed us to stay on track for meeting targets as defined in the performance indicators by the end of Y3. While there are definitely areas that will require focused effort in what remains of the project period (e.g. private sector buy-in and use of the model in decision making), we are confident that we have laid the groundwork for effective outreach to these groups, with the help of the government, academic and NGO stakeholders who have consistently participated in and supported the DHRU and the aims of IDEEAL.

## 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

### 3.1 Gender Equality and Female Empowerment

- (b)(6) now serves as the Director of the DHRU and is in a position to foster women's participation and leadership in environment and health issues. There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal female/male participation planned for future stakeholder meetings.
- We have enrolled two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby and P&G.
- A proposal was submitted to J&J for future funding.



- Future targets for industry engagement in Malaysia are Cargill, Mars, McDonald's, Unilever, Nestle and GE.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Stakeholders continue to be involved in toolkit development, providing input and comments on content and wording.
- PACOS and BCI are fully engaged in toolkit dissemination plan, with facilitators trained and additional trainings planned.
- Submitted application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District. Application was approved. Human Animal Contact Survey in Telupid started June 2016. DEEP FOREST sampling in Telupid started in July. We have continued engagement with Wilmar and P&G.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.

#### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE and FMHS regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with PoC at UMS for DHRU, (b)(6) and other faculty, (b)(6) to establish formal agreement to host the DHRU.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

##### 7.1 Required data gathered to run quantitative model

- Conducted literature search for existing studies or valuations of use of degraded land in agricultural production.

##### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Continue analysis on factors linking land conversion and disease emergence.

##### 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.

- Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur; have finalized contract to support Masters' students through the DHRU.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and participation in the EcoHealth/One Health Congress in Melbourne, Australia 2016.
- Will conduct additional introductory and advanced R software and training workshops at UMS in August.

#### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Toolkit outreach and modification will continue. This includes:
  - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
  - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
  - Working with stakeholders to conduct toolkit sessions in communities throughout Sabah.
  - Training additional community members as toolkit facilitators.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

Last November, EHA became a member of the Roundtable on Sustainable Palm Oil (RSPO) and sponsored a booth detailing our work in Sabah with scientists fielding questions from various stakeholders including government, industry, and NGOs. EHA continues to leverage industry contacts to assist in increasing the awareness of our work by presenting at the conference this year.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).



**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Sabah Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, Wilmar, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company.*



*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*

*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

### **8.4 Milestones**

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference "Links between Land Change, Development and Health" held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.



June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.



March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:  
First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J’s sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.

July 2016: CoP signed a contract to fund 3 Masters’ students through the DHRU; conducted media interviews;

CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

## Appendix

### **Summary Report of Findings from the Deep Forest Human-Animal Contact Survey, Sabah.**

#### **Executive summary**

This report summarizes the key findings of the DEEP FOREST Human-Animal Contact (DFHC) Survey implemented in the Kinabatangan Region, Sabah in May 2014. This survey was developed to assess direct and indirect human contact with animals and characterize human animal contact across a land-use gradient. We categorized areas of forest as one of three gradient levels, based on degree of disturbance due to land-use change: high, intermediate, and low disturbance. In each gradient level, the survey was used to quantify human contact with wildlife, which are potential reservoirs of disease. Particular attention was paid to bats, rodents, and primates but there was also interest in quantifying contact with other types of wild and domestic animals to which people are frequently exposed. Results from the survey indicate how human-animal contact -a fundamental but poorly quantified measure in disease systems- might vary with land-use practices and intensity of disturbance.

We interviewed people across the land-use gradient including in completely highly converted landscape (oil palm plantations), intermediate disturbance landscape (in and around local villages), and in low disturbance forest (Gomantong Forest Reserve). Survey data was collected using structured household surveys. Questionnaire surveys were administered to communities located along a disturbance gradient in the Kinabatangan region and consisted of five parts: 1) household information; 2) domestic animals; 3) non-raised animals; 4) animals eaten and/or hunted; and 5) shared resources between humans and animals. Our specific objectives were to 1) quantify the types and frequencies of human-animal contact along a land use change gradient and 2) collect socio-demographic and baseline data on existing practices to inform disease prevention and control.

We found that the gradient level matters for several of the contact metrics we quantified, including wildlife consumption and indirect contact with animals via shared resources. Further, we found an important difference among ethnicities in regards to wildlife consumption. This study has also provided valuable preliminary information regarding the types of animals with which people have direct and/or indirect contact. This is crucial to our understanding of risk, given that we are also collecting samples from wildlife in order to provide information on the presence of various viruses. We do however caution that the survey results are still preliminary and more surveys are required to draw robust conclusions, especially in reference to differential risk amongst subgroups.

Data from both the Deep Forest wildlife sampling and DFHC surveys will ultimately be used to inform the change of EID spillover along a pristine-to-disturbed gradient, and subsequently provide an index of risk that can be applied across different landscapes. Sample collection from wildlife will provide information on the prevalence/incidence of known pathogens, in addition to data on completely novel pathogens from viral families that are known to cause disease in humans.

#### **Introduction**



Approximately 20% of novel emerging infectious diseases (EIDs) and 50% of emerging and re-emerging zoonotic diseases have been attributed to land-use change. Land-use changes include human activities such as deforestation, road construction, and the expansion of urban environments (Patz et al. 2004) and are thought to affect the risk of cross-species transmission (“spillover”) by altering the dynamics of zoonotic pathogens (those transmissible between animals and humans) in wildlife hosts and/or by bringing novel host-pathogen pairs (including humans) into contact for the first time (Murray and Daszak 2013).

Characterizing the known and unknown viral diversity and describing the relationship between viral diversity, host diversity, land-use change, and human ecology is critical for understanding zoonotic disease emergence so that infectious disease outbreaks can be prevented. As part of surveillance activities PREDICT is implementing the Deep Forest study to enhance the understanding of ecological and socioeconomic factors that drive zoonotic disease emergence due to land-use change. This project has and will continue to refine our approach in the global scale ‘hotspots’ modeling, by providing detailed information about risk at a local level - a scale at which humans live and interact with wildlife and livestock. This report contains data and analysis from the first human-animal contact survey conducted under Deep forest in the Lower Kinabatangan River region of Sabah in May 2014.

The Deep Forest study aims to evaluate how land development influences 1) patterns of biodiversity; 2) corresponding patterns of viral diversity; and 3) patterns of human occupancy, abundance, and behavior that may influence contact rates with wildlife in changing landscapes.

To determine patterns of human occupancy, abundance and behavior, PREDICT has developed a standardized Deep Forest Human-Animal Contact (DFHC) survey for assessing direct and indirect human contact with animals. The underlying survey can be used in a variety of settings and in different countries, but requires tailoring to the local context. The survey characterizes human animal contact across a land-use gradient. We categorized areas of forest as one of three gradient levels, based on degree of disturbance from land-use change: high, intermediate, and low disturbance. In each gradient level, the survey was used to quantify human contact with wildlife, which are potential reservoirs of pathogens. Particular attention was paid to bats, rodents, and primates but there was also interest in quantifying contact with other types of wild and domestic animals to which people are frequently exposed.

Results from the survey indicated how human-animal contact -a fundamental but poorly quantified measure in disease systems- might vary with land-use practices and intensity of disturbance. The survey is adapted and tailored to the country, sub-population and setting in which it is to be implemented. Although individual questions may vary as they are adjusted to local contexts, key indicators of contact will be measured in all surveys to ensure comparable data across study regions.

## **Methods**

In Sabah, Malaysia, we interviewed people across the land-use gradient including areas highly disturbed (e.g. oil palm plantations), intermediate disturbance (in and around local villages), and low disturbance areas (e.g. Gomantong Forest Reserve). Survey data was collected using structured household surveys. Questionnaire surveys were administered to communities located along a disturbance gradient in the Kinabatangan region and consisted of five parts: 1) household information; 2) domestic animals; 3) non-raised animals; 4) animals eaten and/or hunted; and 5) shared resources between humans and animals. Our specific objectives were to:

- To quantify the types and frequencies of human-animal contact along a land use change gradient;



- To collect socio-demographic and baseline data on existing practices to inform disease prevention and control;

The following definitions were used:

- Contact event – the state of being in close contact or proximity to source of infection, which provides an opportunity for viral transmission. Basic unit of interest.
- Contact type - the 'riskiness' of a particular class of contact event (e.g., eating versus seeing).
- Contact type may largely drive our picture of landscape level differences in transmission potential. Expert opinion is required to rank contact types by riskiness.
- Contact frequency – the number of times a contact event occurs within a given period.

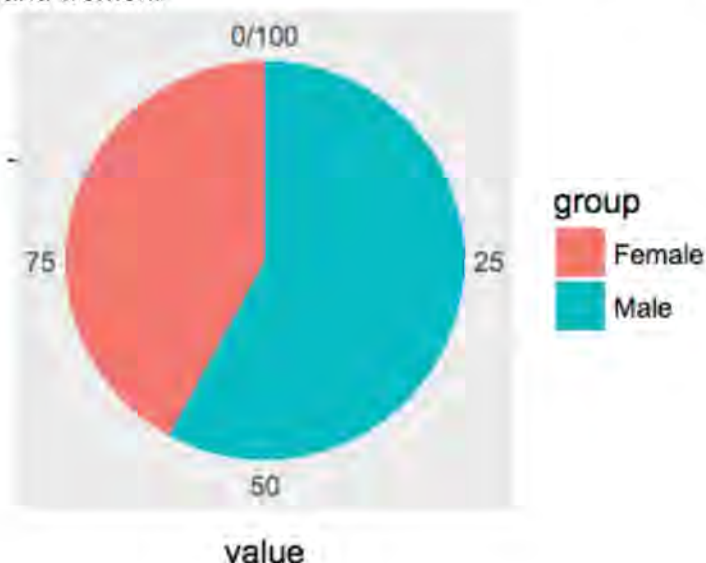
Data from 406 surveys were used to generate summary statistics looking at the types of animals with which people had contact, the types of contact, and patterns of contact along the land-use gradient. We conducted 205 household interviews with respondents living in or near high disturbance areas, 152 interviews with individuals living in intermediate disturbance areas, and 49 interviews with individuals residing in areas with low disturbance. To compare types of contact at the gradient level, chi-square analysis was used to determine whether there were significant differences between 'pristine', intermediate and high disturbance sites. In the case of smaller sample sizes, Fisher Exact tests were used.

## Results

### 1. HOUSEHOLD INFORMATION

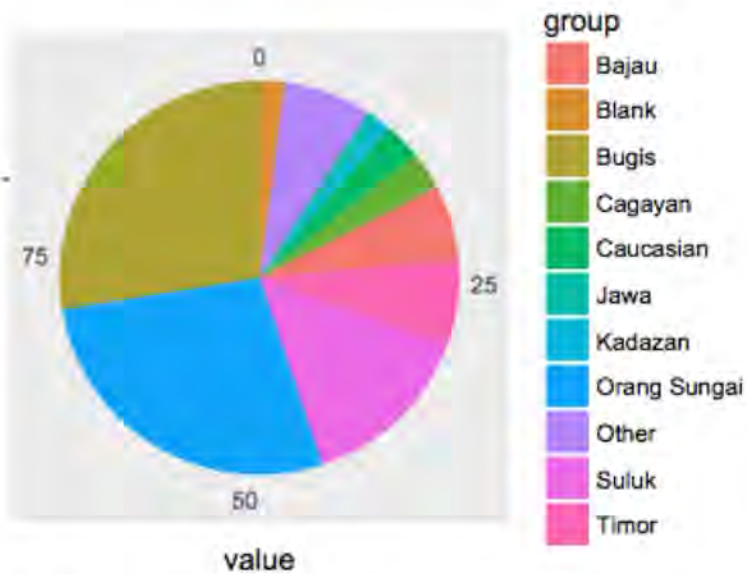
**Figure 1.** Gender of survey respondents

Independent samples were obtained for men (n=234) and women (n=172) as one of the goals of this survey was to estimate differences in exposures for different sub groups including men and women.



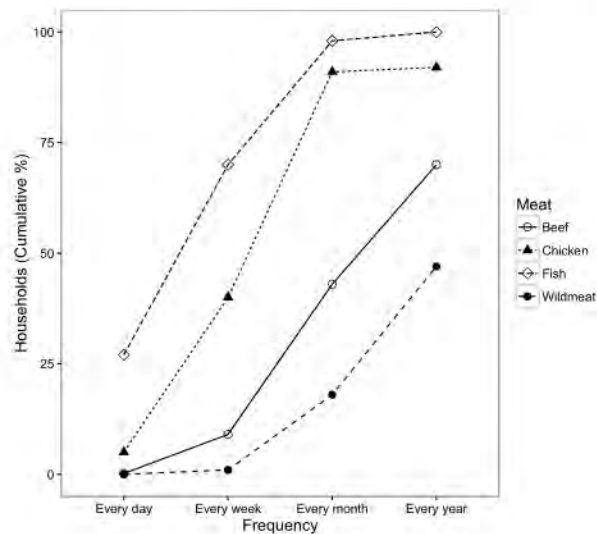
**Figure 2.** Ethnicity of survey respondents

Bugis, Orang Sungai and Suluk comprised the majority of respondents interviewed.



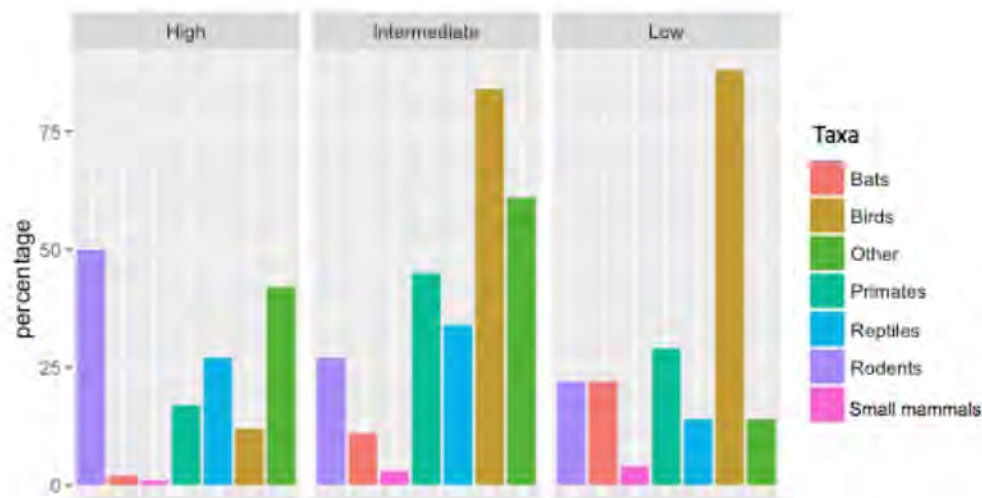
## 2. DOMESTIC ANIMALS

**Figure 3.** Frequency of domestic and wild meat consumption  
Domestic animals including chicken, beef, and fish were consumed more commonly and with greater frequency than wild meat.



## 3. NON-RAISED ANIMALS

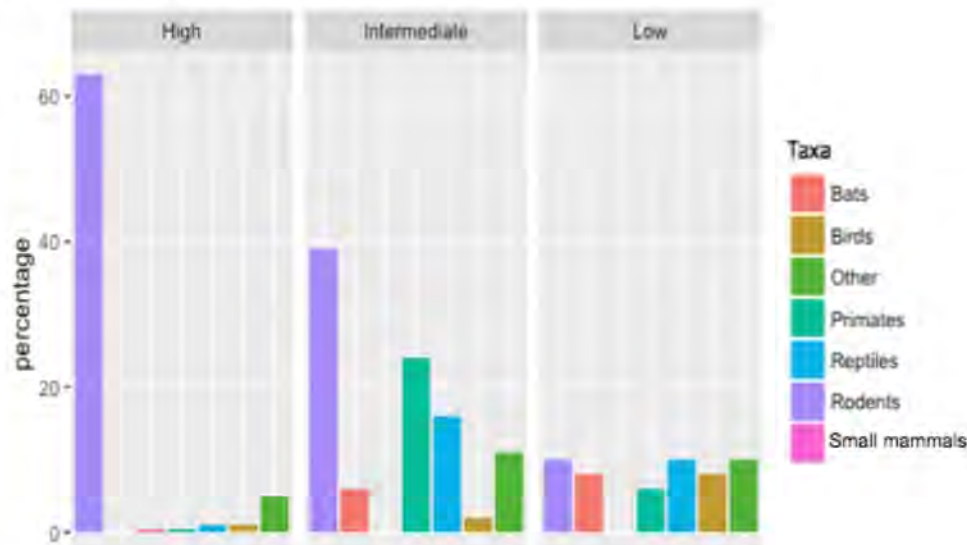
**Figure 4.** Categories of animal seen near home  
The following figure summarizes the responses on types of animals seen near home, by gradient level, totaling the number of responses in each category. Most notably, more respondents reported seeing rodents near their homes in high disturbance areas compared to less disturbed areas, while a higher percentage of respondents reported seeing bats, primates and birds in low disturbance areas compared to areas with high disturbance.



	Rodents	Small mammals	Bats	Primates	Reptiles	Birds	Other	Skipped	Not answered	Blank
High	104	3	4	34	55	25	87	33	11	0
Intermediate	55	5	16	69	52	127	92	10	4	11
Low	11	2	11	14	7	43	7	1	0	21

**Figure 5.** Types of animals seen in the home

Rodents were the most common type of wildlife reported inside the home across all gradient levels. A high number of respondents skipped this question (n = 119). Rodents were more commonly reported in high disturbance area (n=129), compared to the intermediate (n=60) and low disturbance (n=5) areas.

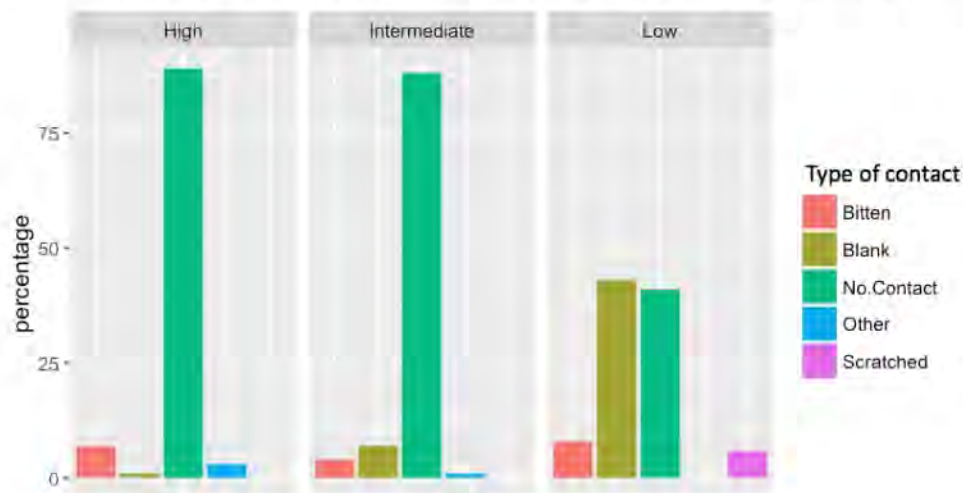


	Rodents	Small mammals	Bats	Primates	Reptiles	Birds	Other	Skipped	Not answered	Blank
High	129	1	0	1	3	3	10	58	12	0
Intermediate	60	0	9	37	24	3	16	50	1	11
Low	5	0	4	3	5	4	5	11	2	21



**Figure 6.** Type of wildlife contact across gradient

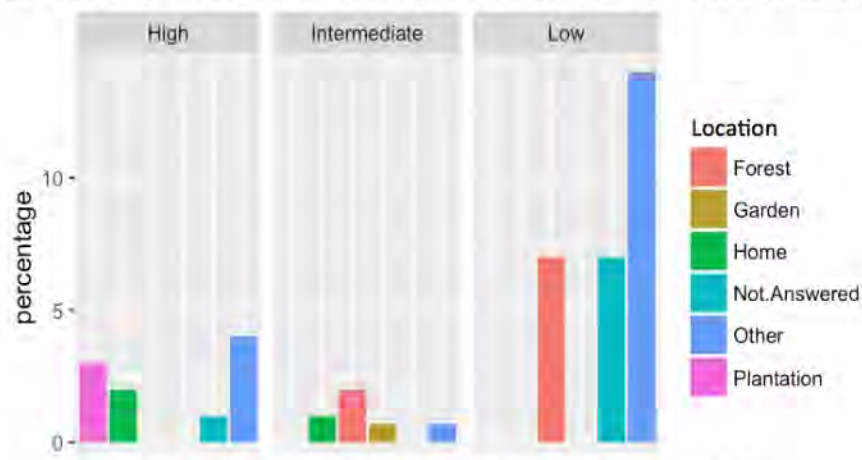
The majority of respondents across all gradients reported no animal contact (n = 336). Only respondents in the low disturbance areas reported being scratched (n=4).



	Bitten	Blank	No Contact	Other	Scratche d
High	14	2	182	6	0
Intermediate	6	11	133	2	0
Low	4	21	20	0	4

**Figure 8.** Where contact from wildlife occurred

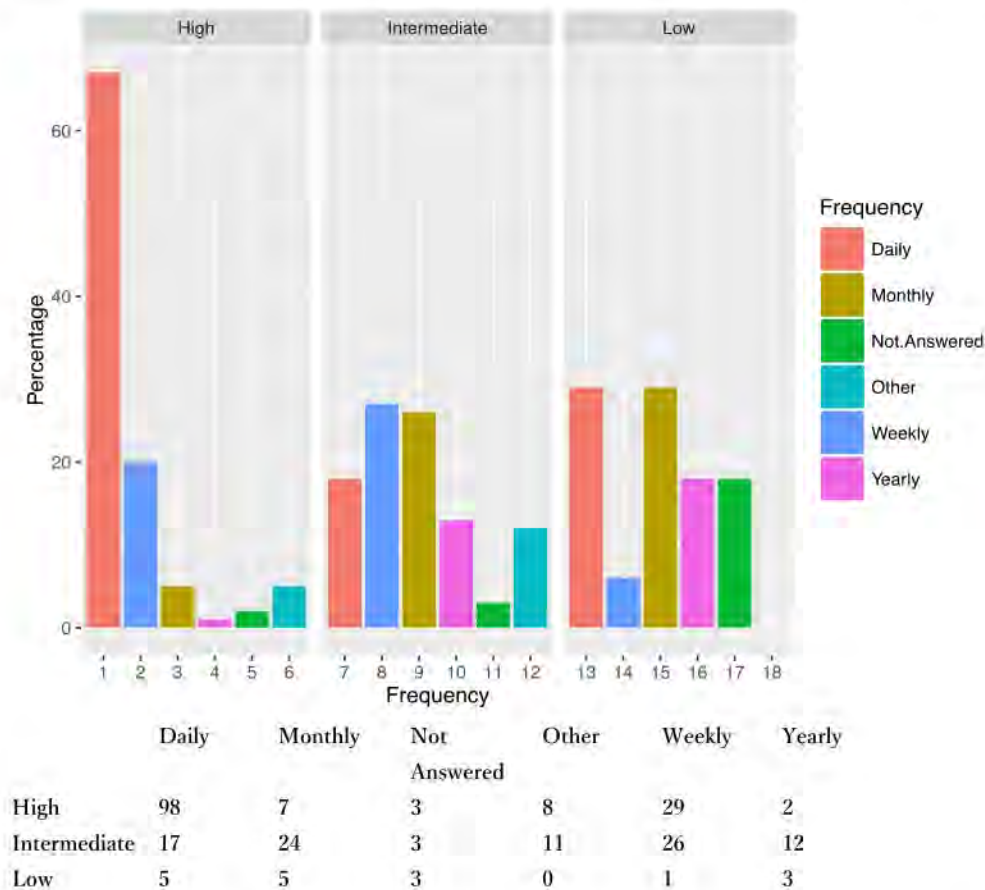
Only respondents in high disturbance areas reported contact with wildlife in plantations, while respondents in intermediate and low disturbance areas reported contact in the forest. In total, the majority of respondents reported 'other' (n=13) as the location where contact occurred.



	Plantatio n	In Home	In Forest	In Garde n	Not Answer d	Other
High	6	4	0	0	3	8
Intermediate	0	2	3	1	0	1
Low	0	0	2	0	2	4

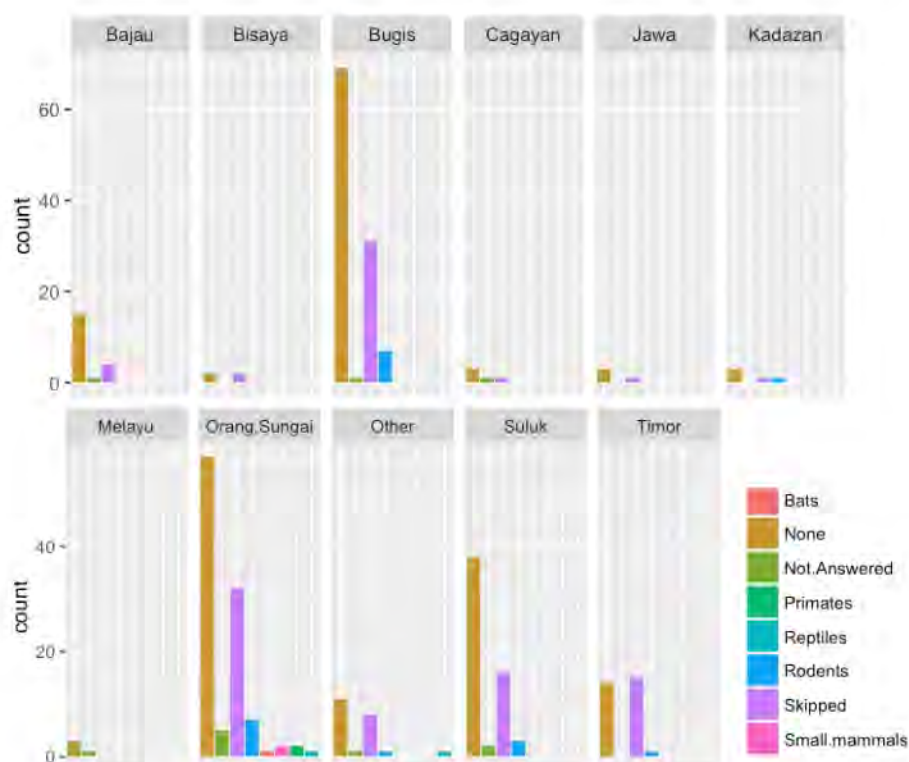
**Figure 9.** Frequency of wildlife seen in home

More respondents (67%) in high disturbance areas reported seeing wildlife in their home on a daily basis compared to intermediate areas (18%) and low disturbance (29%) areas.

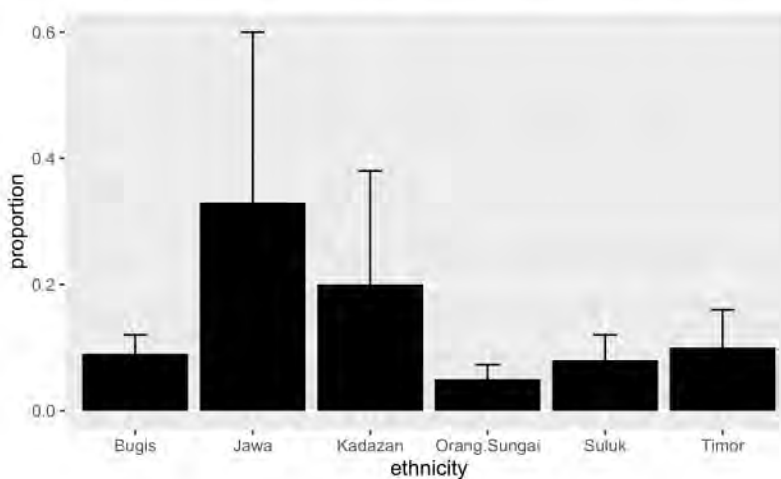


**Figure 10.** Number of respondents that have had contact with different types of animals by ethnicity.

The majority of respondents reported having no contact with wildlife, or they chose to skip the question. However, the Orang Sungai reported having contact with the widest range of animals including bats, primates, rodents, reptiles, and small mammals.

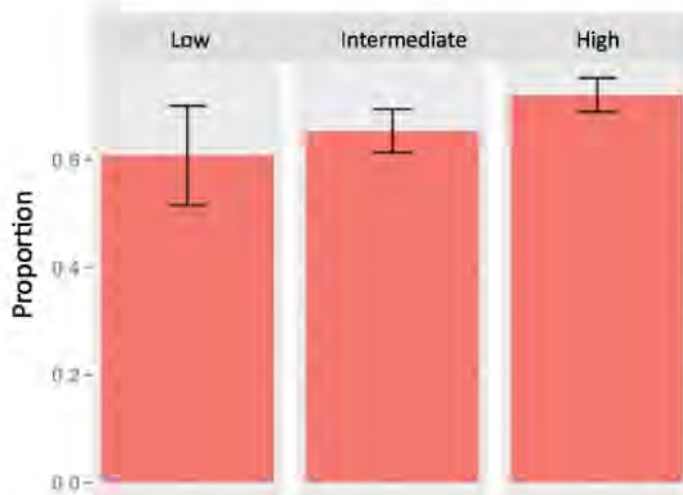


**Figure 11. Proportion of respondents that reported being bitten by wildlife by ethnicity**  
 The association between ethnicity and being bitten by wildlife was examined using a Fishers exact test. The relationship between the two variables was not significant (p-value = 0.2839) indicating that there was not a significant difference between ethnicities.



**Figure 12. Proportion of respondents that reported seeing wildlife in their house across the gradient.**  
 The association between gradient level and seeing wildlife inside the home was examined using a Chi-square test. The relationship between the two variables was not significant ( $\chi^2 = 2.58$  df = 2, p=0.2753) indicating that there was not a significant difference between gradient levels.

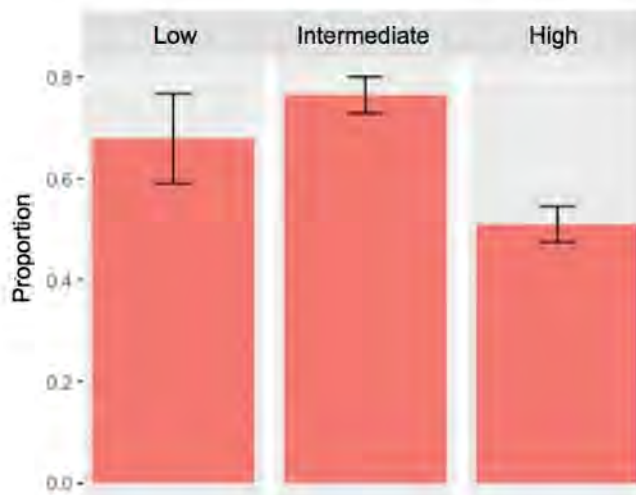




	No	Yes
High Disturbance	57	146
Intermediate Disturbance	49	92

#### 4. Animals eaten and/or hunted

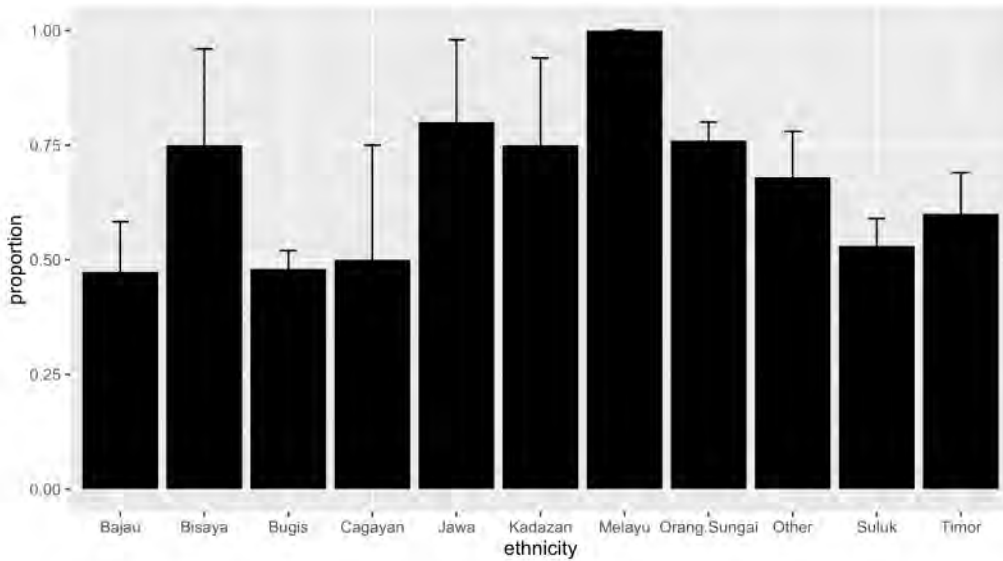
**Figure 13.** Proportion of respondents that reported consuming wildlife across the gradient. The association between gradient level and wildlife consumption was examined using a Chi-square test. The relationship between the two variables was significant ( $\chi^2 = 23.25$  df = 2,  $p < 0.001$ ) indicating that there was a significant difference between gradient levels with less wildlife consumption in the urban area. There was no significant difference between Low disturbance and intermediate disturbed areas ( $\chi^2 = 0.9143$ , df = 1,  $p > 0.05$ ).



	No	Yes
High Disturbance	100	104
Intermediate Disturbance	33	107

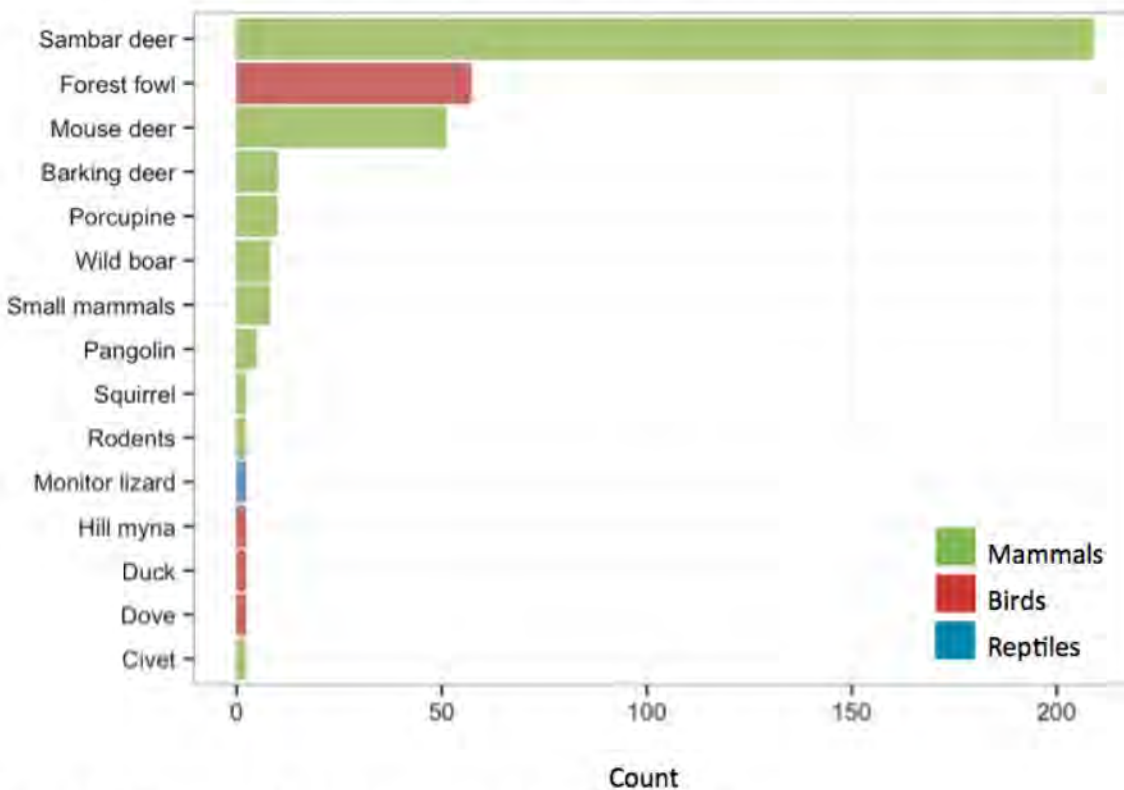
1.

**Figure 14.** Proportion of respondents that reported eating wildlife by ethnicity. The results suggest a positive association between ethnicity and wildlife consumption. However, the low sample size per ethnicity does not allow for generalizations. Therefore, this figure must be taken as an illustrative process of data analysis.



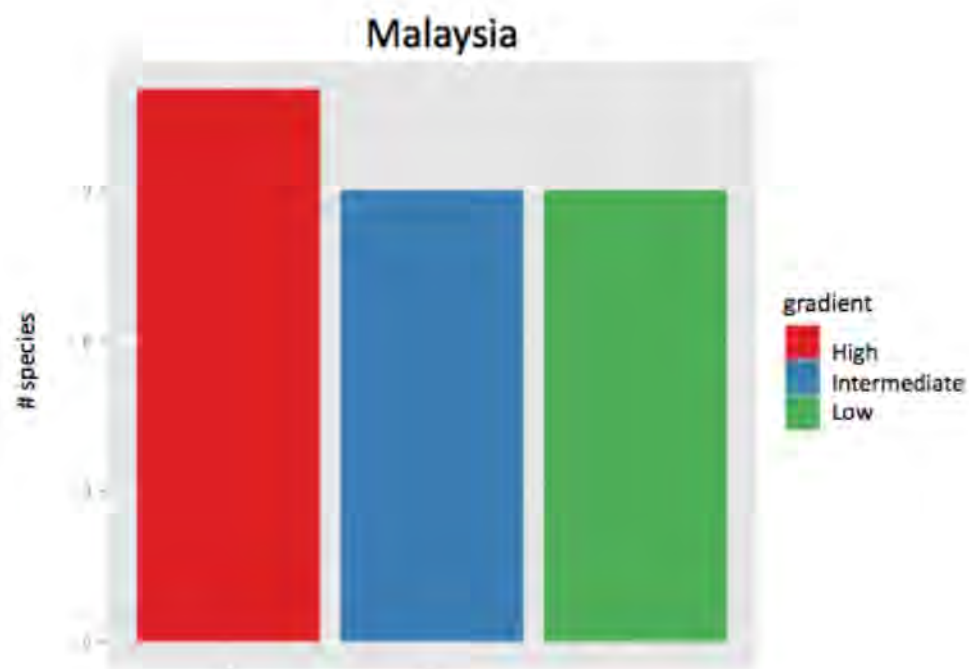
**Figure 15. Types of wildlife consumed**

The three most commonly consumed types of wildlife were sambar deer, forest fowl, and mouse deer. There were 10 types of mammals consumed, 4 types of birds and one reptile.



**Figure 16. Diversity of wildlife consumed across the gradient**

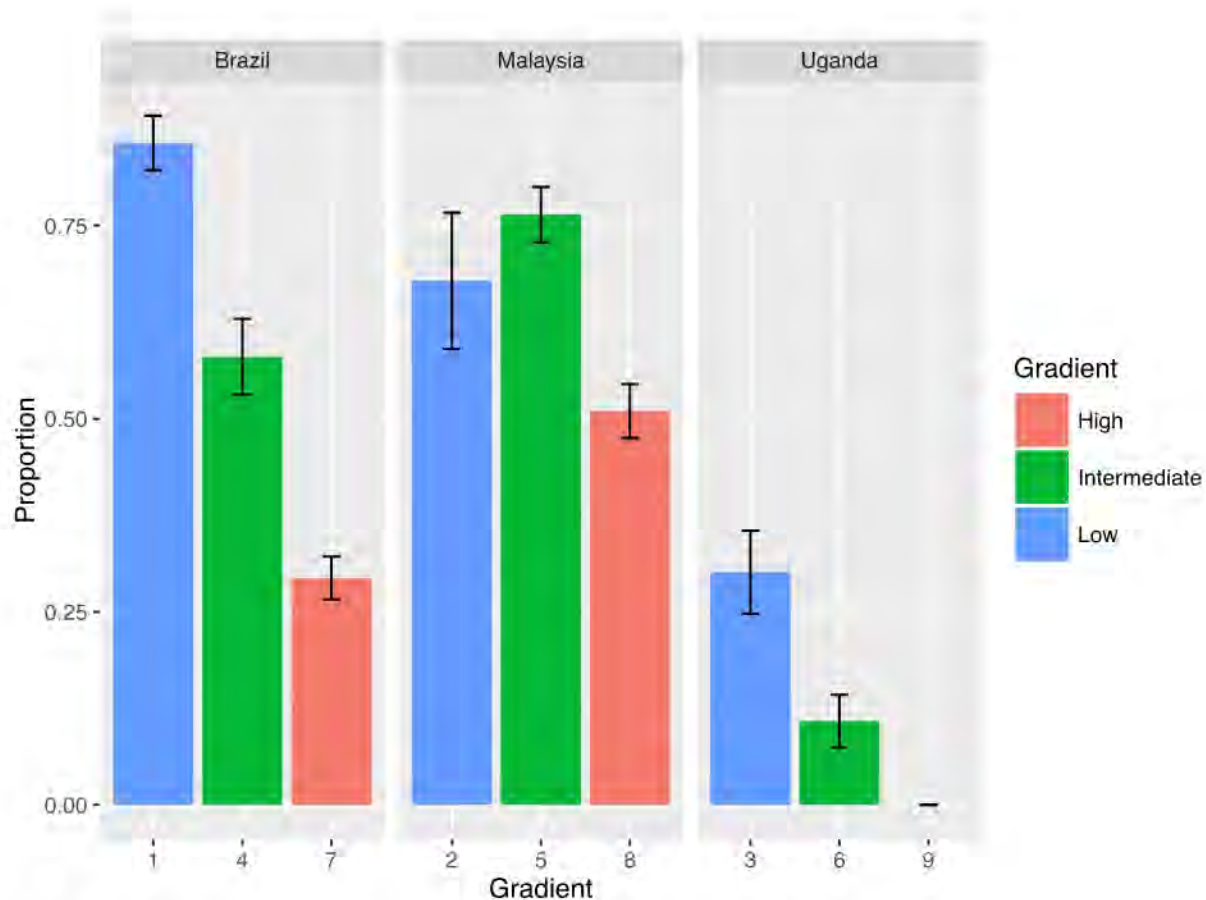
The diversity of wildlife consumed in high disturbance areas is greater than in intermediate or Low disturbance areas.



**Figure 17.** Current and past wildlife consumption across all Deep Forest countries.

This figure illustrates the effect of the gradient level on one high-risk behavior, the **consumption of wildlife**. Self-reported wildlife consumption patterns differed considerably among countries and gradient levels and may be partially reflective of cultural differences and laws and their enforcement regarding wildlife protection. Generally speaking, there was less wildlife consumption reported in Uganda than in Brazil or Malaysia, and less wildlife consumption in the disturbed sites compared to the intermediate and pristine sites in the two countries reporting high wildlife consumption (Brazil and Malaysia). This finding has implications for the risk of spillover from wildlife as a result of wildlife consumption in different cultural contexts and illustrates why all potentially high-risk behaviors should be explored across geographic and cultural zones.

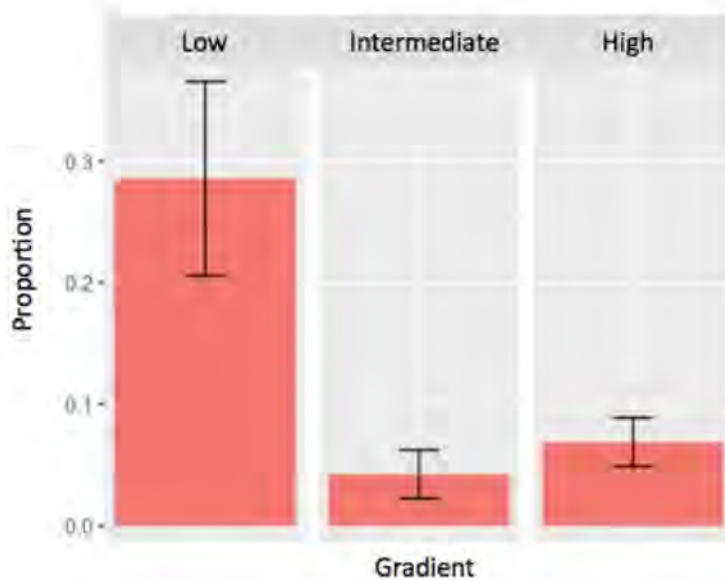




## 5. Shared resources

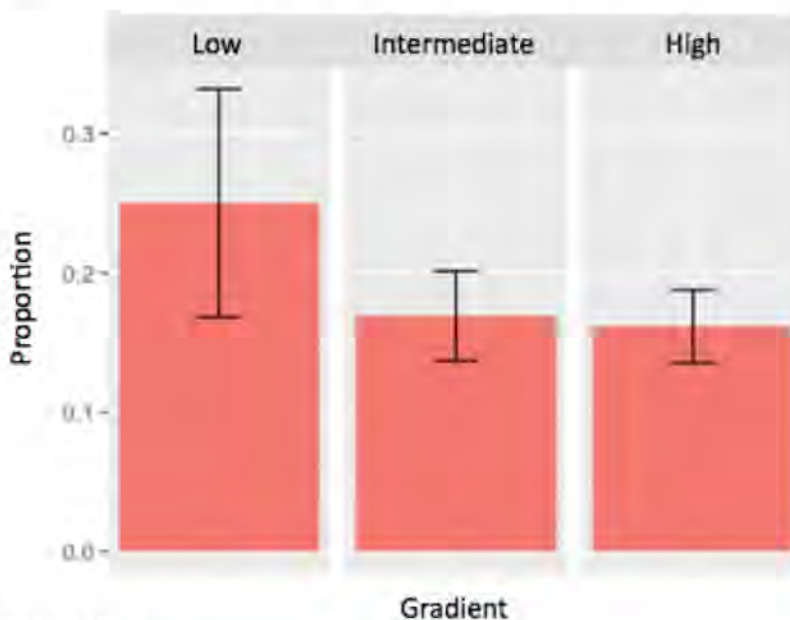
**Figure 18.** Proportion of respondents that reported seeing bite marks on fruits across the gradient.

The association between gradient level and seeing bite marks on fruit was examined using a Chi-square test. The relationship between the two variables was significant ( $\chi^2 = 8.66$  df = 2,  $p < 0.01$ ) indicating that there was a significant difference between gradient levels, with respondents in the Low disturbance area more commonly reporting bite marks on their fruit. There was no significant difference between intermediate and high disturbance areas ( $\chi^2 = 0.3763$ , df = 1,  $p > 0.05$ ).



	No	Yes
High Disturbance	100	104
Intermediate Disturbance	33	107
Low Disturbance	9	19

**Figure 19.** Proportion of respondents that report sharing water with wildlife across the gradient. The association between gradient level and sharing water with wildlife was examined using a Chi-square test. The relationship between the two variables was not significant ( $\chi^2 = 1.33$  df = 2,  $p=0.5143$ ) indicating that there was a not significant difference between gradient levels.



	No	Yes
High Disturbance	164	32
Intermediate Disturbance	115	23

## Discussion

Globally, a series of devastating zoonoses have emerged in the past few decades as humans have encroached into tropical rainforests. These include diseases that cause significant regional economic and health impacts (e.g. Ebola virus disease in West Africa, Nipah virus in Malaysia and Bangladesh) and others with global impact (e.g. HIV/AIDS). The emergence of these and other diseases has occurred in areas where high levels of biodiversity overlap with human populations<sup>1</sup>. Thus, tropical communities developing along the forest edge are prime

areas to investigate for the emergence of new human pathogens<sup>1</sup>.

Previous studies have shown that wildlife or domestic animals living in close contact with people have the potential to transmit disease, either directly or indirectly (e.g. through contamination of food or water). Bats and rodents are frequently sources of zoonotic diseases, as collectively they include some common and abundant species that live in close association with people<sup>2,3</sup>. In Malaysia, human-induced disturbances to the environment such as intensive agriculture and deforestation have resulted in humans, domestic and wild animals sharing the same habitat, along with their pathogenic microorganisms. In peninsular Malaysia, the transmission of Nipah virus has been linked to the close proximity of mango plantations to intensively-managed pig farms, leading to transmission of Nipah virus from bats to pigs via contaminated fruit dropped by bats into pig enclosures. In rural Bangladesh, where people live in close association with large fruit bats, spillover occurs directly from bats to people via a similar mechanism: contamination of date palm sap by bats, which is then consumed by people. By examining patterns of human-animal contact along a land-use gradient, this study is providing information on how likely an individual is to have contact with different types of wildlife directly, indirectly or inadvertently, and how the patterns of contact may vary at the landscape level.

For instance, according to our results, there are significant gradient level effects on two metrics of contact: 1) wildlife consumption and 2) animal contact with fruits, with more people in the Low disturbance area reporting wildlife consumption and reporting seeing bite marks on the fruits they consume. Further, we found significant differences among various ethnicities in regards to wildlife consumption and those that reported being scratched by wildlife. Data collected during this study has also provided valuable preliminary information including the types of animals with which people have direct and indirect contact. This is crucial to our understanding of risk, given that we are also collecting samples from wildlife in order to provide information on the prevalence/incidence of various viruses. We do however caution that the survey results are still preliminary and larger sample sizes are required to draw more robust conclusions, especially in reference to differential risk amongst subgroups.

### **Next steps**

Data from both the Deep Forest wildlife sampling and DFHC surveys will ultimately be used to inform the likelihood of EID spillover along a pristine-to-disturbed gradient, and subsequently provide an index of risk that can be applied across different landscapes. Sample collection from wildlife will provide information on the prevalence/incidence of known pathogens, in addition to data on completely novel pathogens from viral families that are known to cause disease in humans. Data from this and additional surveys which are currently underway, will provide critical information on how likely an individual is to have contact with different types of wildlife directly, indirectly or inadvertently, and how the patterns of contact may vary at the landscape level. We are about to begin collecting contact data around Telupid in the Beluran District in Sabah to increase our sample sizes and to better inform our overall analysis of the likelihood of EID spillover along a land-use gradient. Data from the second round of the survey in Beluran District

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<sup>1</sup> Wolfe, ND, Heneine H, Carr JK, Garcia AD, Shanmugam V, Tamoufe U, Torimiro JN, Prosser AT, LeBreton M, Mpoudi-Ngole E, McCutchan FE, Birx DL, Folks TM, Burke DS, and WM Switzer. Emergence of novel primate T-lymphotropic viruses among central African bushmeat hunters. *Proceed. Nat Acad Sci.* 2005; 102:7994-7999

<sup>2</sup> Ghatak S, Banerjee R, Agarwal RK, Kapoor KN. Zoonoses and bats: a look from human health viewpoint. *J Commun Dis.* 2000 Mar;32(1):40-8.

<sup>3</sup> Morrison G. Zoonotic infections from pets. Understanding the risks and treatment. *Postgrad Med.* 2001 Jul;110(1):24-6, 29-30



will provide valuable insight on human-animal contact and differential risk among different sub-groups including gender, ethnicity, religion, age, occupation, and location compared to the communities in the Kinabatangan region.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 3 Quarter 4 – July 15, 2016 to October 14, 2016

Submission Date: January 10, 2016

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to October 14, 2016

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 - October 14 <sup>th</sup> 2016
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	July 15, 2016 – October 14, 2016



## LIST OF ACRONYMS

ADO	Assistant District Officer
AMCHAM	American Malaysian Chamber of Commerce
BAU	Business as Usual
BCI	BC Initiative
BORA	Bornean Rhino Alliance
BRI	Biotechnology Research Institute
CoE	Center of Excellence
COC	Community Outreach Coordinator
CoP	Chief of Party
Co-PI	Co-Principal Investigator
CRI	Centre of Research and Innovation
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DSHS	Department of State Health Sabah
DVC	Deputy Vice Chancellor
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DCoP	Deputy Chief of Party
DG	Director General
EA	Economics Assistant
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
EPU	Economic Planning Unit
FAO	Food and Agriculture Organization
FBEA UMS	Faculty of Business and Economics and Accounting, Universiti Malaysia Sabah
FELDA	Federal Land Development Authority
FHAH UMS	Faculty of Humanities, Art and Heritage, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
FSNR	Faculty of Science and Natural Resources
GCC	Global Climate Change
GDA	Global Development Alliance
GE	General Electric
GIDEON	Global Infectious Disease and Epidemiology Network
GPW	Gridded Population of the World
GRUMP	Global Rural-Urban Mapping Project
HACS	Human Animal Contact Surveys
HIA	Health Impact Assessment
ICU	Intensive Care Unit

## LIST OF ACRONYMS (CONTINUED)

IFC	International Finance Corporation
IOI Group	Industrial Oxygen Inc.
IR	Indicator Reference
ITBC	Institute for Tropical Biology and Conservation
IUCN	International Union for Conservation of Nature
J&J	Johnson and Johnson Company
KL	Kuala Lumpur
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MISI	Malaysian Institute for Supply Chain Innovation
MNS	Malaysian Nature Society
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
MRD	Ministry of Rural Development
MREC	Medical Research and Ethics Committee
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organization
NIH	National Institutes of Health
NMRR	National Medical Research Register
OCA	Organizational Capacity Assessment
P&G	Proctor and Gamble
PACOS Trust	Partners of Community Organisations Sabah Trust
PAWSE	Protective Action for Wildlife in Sabah through Education
PEMANDU	Performance Management and Delivery Unit
PERHILITAN	Department of Wildlife and National Parks Peninsular Malaysia
PL	Policy Lead
PPP	Public Private Partnership
QA	Quality Assurance
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
RTM	Radio Television Malaysia
SaBC	Sabah Biodiversity Council
SCL	Stakeholder Coordination Lead
SDC	Sabah Development Corridor
SEARRP	South East Asia Rainforest Research Partnership
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department

## LIST OF ACRONYMS (CONTINUED)

SM	Senior Modeler
SSHHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
UMS	Universiti Malaysia Sabah
UN	United Nations
UNDP	United Nations Development Programme
UNIMAS	Universiti Malaysia Sarawak
UPEN	Sabah Economic Unit
USAID	United States Agency for International Development
USGS	United States Geological Survey
VC	Vice Chancellor
TEV	Total Ecosystem Value
TOR	Terms of Reference
VBDC Unit	Vector Borne Disease Control Unit
WHGFL	Wildlife Health, Genetic and Forensic Laboratory
WHO	World Health Organization
WHU	Wildlife Health Unit
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature
YSD	Yayasan Sime Darby



## 1.1 Program Description/Introduction

Under a three-year cooperative agreement with USAID/RDMA, and in partnership with Sabah Wildlife Department (SWD), the Universiti Malaysia Sabah (UMS) Faculty of Business and Economics, Faculty of Medicine and Health Sciences, Department of State Health Sabah and other governmental and non-governmental stakeholders, EHA is: 1) developing a functional, quantitative set of models which capture gender sensitive emerging infectious disease-related health costs and savings as a function of land-use; 2) producing actionable model outputs and analyses to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; 3) building alliances amongst a diverse range of stakeholders; 4) integrating cross-disciplinary approaches in gathering, analyzing and disseminating information; and 5) establishing a training, learning, and resource sharing platform in Sabah to sustain project impacts after the project.

A Center of Excellence for economic analysis of land-use change and health outcomes will be developed. The Development and Health Research Unit (DHRU) has been identified as an international resource for the science and policy of land-use change and the cost of disease emergence and will be based at the Faculty of Business and Economics and Faculty of Medicine and Health Sciences at the Universiti Malaysia Sabah (UMS). EHA has worked to engage multiple departments at UMS through DHRU including staff and students from Faculty of Science and Natural Resources, Faculty of Humanity, Arts and Heritage, Faculty of Sustainable Agriculture, Institute for Tropical Biology and Conservation and the Ethnography and Development Research Unit. Several departments expressed interest in forming the DHRU in early meetings, and the Faculty of Medicine and Health Science, the Faculty of Business and Economics, and the Institute for Tropical Biology and Conservation have been consistently sending representatives to the IDEEAL stakeholder meetings and may put candidates forward for carrying out a Masters' degree through the DHRU. We are still working with the UMS administration to formalize the DHRU, and we plan to have it formally established by Y3. Meanwhile, we have continued to hold stakeholder meetings at the University. The DHRU will be a forum for a multi-disciplinary think tank composed of experts from the fields of economics, disease ecology, forestry, wildlife conservation, and health as well as members of private industry involved in land development in Sabah. EHA will collaborate with these experts to develop outreach materials and strategies, the DHRU will serve as a platform from which information and toolkits will be disseminated. These toolkits will provide stakeholders—community members, private industries, researchers, government officials, and policy makers—the ability to translate science into action, with particular consideration for gender sensitive issues.

EHA and project partners will produce four main deliverables: 1) quantitative models of land-use change and disease emergence to use in local and regional decision making and that can be generalized or modified for other applications, 2) the Development and Health Research Unit (DHRU) at UMS to serve as a permanent and sustainable center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships of land-use change, disease emergence, and subject area gender-related issues, 3) gender-sensitive health impact toolkits for promoting best practice approaches and translate project findings to ensure gender equality benefits, and 4) scientific communications toolkits that translate research and modeling results for policy makers, private companies, government organizations, and civil society stakeholders.

Expected three-year achievements of IDEEAL are as follows:

- Quantitative model developed, validated, with a plan for scalability
- Strengthened multi-disciplinary research and learning at UMS and DHRU
- Strengthened capacity for data analysis, information dissemination and evidence-based planning among local partners
- Strengthened multi-sector partnerships and collaborative land-use planning



## 1.2 Summary of Results to Date

Indicators	Year 3				
	Baseline	Exp	Act	Ratio	Rating
<b>Outcome indicator</b> (Data only available for baseline and years 2 and 3)					
Number and percentage of Center of Excellence’s partners and stakeholders who are able to utilize the model in land-use planning	0%				
External resources support leveraged for sustaining the Center of Excellence operations	0%				
Number of partnerships developed through the Center of Excellence	0				
Number of policy dialogues using scientific findings of infectious disease emergence and economics of altered landscapes	0				
<b>Output indicator</b>					
Number of datasets acquired, cleaned and formatted					
Number of tests run to determine the economic cost linking spillover risk costs with land conversion costs					
Final model developed and validated as planned					
Center of Excellence established and functional	0%				
Number of graduate students trained	0%				
Number of scientific products (e.g., posters, presentations and manuscripts) produced as a result of USAID support	0%				
Knowledge management framework for the Center of Excellence developed and operationalized	0%				
Strategic sustainability business plan for the Center of Excellence developed and operationalized	0%				
Type of products (e.g., toolkits) developed and used	0%				
Outreach and communications plan developed and implemented	0%				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- July 15<sup>th</sup> CoP and DCoP present IDEEAL work to RDMA staff.
- July 18<sup>th</sup> CoP attends contract signing ceremony for DHRU student funding at UMS.
- July 18<sup>th</sup> CoP has meeting with DHRU Research Fellows
- July 18<sup>th</sup> CoP gives DHRU seminar on grant writing at lecture hall FMHS UMS attended by 109 staff and students.



- July 20<sup>th</sup> CoP meets with (b)(6) and (b)(6) Centre for Tropical and Emerging Diseases, Faculty of Medicine & Health Sciences UNIMAS.
- July 22<sup>nd</sup> CoP and DCoP meet with (b)(6) from Future Earth to discuss IDEEAL work in Malaysia and possible event to promote IDEEAL at UN.
- July 27<sup>th</sup> DCoP meets with Sabah State Health Department to discuss access to malaria data at the household level.
- August 5<sup>th</sup> 2016 - EHA Lab manager abstract for poster “Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia” and the 3 DHRU students’ abstracts for posters “Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia”, “Soil –Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah” and “Wild Meat Consumption, Preparation and Perceptions of Health Risk in Local Communities” accepted for presentation at the One Health Ecohealth conference in December.
- August 8<sup>th</sup> – HACS completed in Telupid; 450 people interviewed
- August 12<sup>th</sup> – DCoP meets with P&G to discuss IDEEAL and P&G providing water purification sachets for Orang Asli communities we are working with on Peninsular Malaysia.
- August 15<sup>th</sup> and 16<sup>th</sup> Toolkit training at PACOS. Toolkit facilitator training for PACOS staff from HQ and communities. Total of 7 participants trained.
- August 16<sup>th</sup> – DCoP met with (b)(6) to discuss her progress with Ecosystem survey that will provide data for model, species distribution data, hunting data and the potential for IDEEAL model to be a useful tool as part of Sabah’s planning for sustainable Oil Palm by 2020.
- August 17<sup>th</sup> DCoP meets with (b)(6) to discuss web site, development of management plan and issue of DHRU leadership.; DCoP and (b)(6) meet form (b)(6) DVC and (b)(6) DVC to discuss issue of (b)(6) and her handling of DHRU. They are told that (b)(6) will be replace by (b)(6) on 22nd August.
- August 18<sup>th</sup> and 19<sup>th</sup> – Second Introduction to R workshop held at DHRU attended by 15 participants; Toolkit presentation and Toolkit Facilitator training in Kampong Kelampun. Toolkit presented to 37 members of the community and continued facilitator training with 2 members of the community who attend training on 15th and 16th.
- August 18<sup>th</sup> – 6<sup>th</sup> IDEEAL stakeholder meeting held at UMS. Discussed progress with the project and future planed for funding and expansion. Attended by 24 participants from BORA, WWF, HUTAN, DGFC, UMS - FMHS, ITBC, FSNR, BRI, FBEA, as well as colleagues from Indonesia joining for the first time - (b)(6), (b)(6), Directorate of Biodiversity Conservation, Ministry of Environment and Forestry, (b)(6) Staff, Sub Directorate for Natural Resource Security, Directorate of Biodiversity Conservation, Ministry of Environment and Forestry, (b)(6), (b)(6) Faculty of Public Health, University of Indonesia, (b)(6), (b)(6) University of Indonesia, (b)(6), PREDICT-Indonesia and Faculty of Veterinary



Medicine, Primate Research Center at Bogor Agricultural University, and (b)(6) (b)(6) USAID Indonesia.

- August 18<sup>th</sup> DCoP and HF meet with team from Indonesia to discuss expansion of IDEEAL model to Indonesia. Plan to start with Kalimantan looking at impact of oil palm and other extractive industries and Sumatra with a focus on Riau and the impact of the burning.
- August 18<sup>th</sup> – DHRU Research Fellows meeting attended by 7 people from FMHS, FEBA, Main topic of discussion the need for staff from DHRU to do consultation work if Unit is going to progress to a center.
- August 22<sup>nd</sup> – abstract “Analyzing the health value of a tropical forest – New Strategies to mitigate pandemic emergence” accepted for oral presentation at the One Health Ecohealth conference in December.
- September 8<sup>th</sup> – DCoP met with P&G. (b)(6) suggest that we get in touch with Malaysian Palm Oil Board who are interested in the IDEEAL project and might be able to provide some funding. Their main aim is to improve yield and quality to increase income and also the Malaysian Standard for Palm Oil who would be interested in health aspect of modeling and the toolkit. DCoP, (b)(6) (b)(6) who is involved in P&G Environmental Stewardship & Sustainability plan to have a meeting on October 18<sup>th</sup>.
- September 20<sup>th</sup> – DCoP speaks with (b)(6) from RSPO re EHA assisting RSPO with their land use change analysis as part of their certification process. This would give us access to aggregate data from plantations around the world about land use change, High Conservation Value Areas etc. Plan to discuss further at RSPO in November.
- September 26<sup>th</sup> – SSHD agree to provide malaria data at the household level.
- September 28<sup>th</sup> – DCoP attended semiannual Sabah Zoonotic Diseases Committee meeting hosted by Sabah State Health Department. Attended by SSHD, DVS Sabah, SWD and staff from UMS. EHA invited to join the committee and provided report on PREDICT virus findings, IDEEAL modeling and Human Animal Contact Survey.
- October 8<sup>th</sup> – US National Public Radio and EHA Associate Vice President visited Deep Forest sites at Kinabatangan and Telupid and discussed IDEEAL work.

#### 2.1.1 Toolkit Development

- Toolkit facilitator training conducted in August 2016 and 7 facilitators trained to use the toolkit in Sabah
- Trained facilitators presented toolkit in Kampung Kalampung to an audience of 37 participants from several surrounding villages
- Working to ensure that final English and Bahasa Malaysia versions of the toolkit align

#### 2.1.2 Modeling Activities

- Implementation is on target according to indicators.

## 2.2 Implementation challenges

- Limited data availability in Sabah (demographic, industry, and epidemiological) makes estimating parameters needed to run the model difficult. Faster computational timing using Fortran allows for exploration of a wider range of parameterizations and assumptions.

## 2.3 M&E Update

### **The Establishment of the Development and Health Research Unit**

#### **Evaluation of the Development Health and Research Unit**

##### **Current performance**

- The progress of the DHRU towards its IR outputs are included in the quarterly reports and specific activities and updates are reported in narrative form. In general, the DHRU has made considerable progress towards its primary goals based on Output Indicators 2.1 a-c (see M&E Figure 2) in that it is a functional Unit housed at UMS, has hosted multiple stakeholder meetings, conferences, seminars and training workshops; all in alignment with the aims of IDEEAL and objectives for the DHRU. The three graduate students have now enrolled and have projects and academic advisors. A contract has been signed by the CoP and UMS ensuring funding for the student research projects. The University Vice Chancellor has confirmed that a new director will rotate in to lead the DHRU (b)(6) (b)(6) which we anticipate will prompt forward progress. We have drafted a constitution for the DHRU, a necessary step towards promoting it to a Center of Excellence. The draft constitution was submitted to the Vice Chancellor for review. The following is a summary of progress against specific DHRU assessment areas as stated in the M&E document (Table 2): Organizational Capacity Assessment Areas.
- *Governance, vision and mission:* The VC and current DHRU Director have agreed that the position of Director will be a 2-year rotating position. A new Director has been appointed (Dr. Helen). The Director of the DHRU will remain the IDEEAL team's primary PoC for organizing activities through the DHRU. A constitution and management plan for the DHRU was drafted and submitted to the Vice Chancellor for review.
- *Administration:* The DHRU has established working groups composed of UMS faculty to work on toolkit development, the DHRU management and planning seminars. Three Masters' students have enrolled via the DHRU. We have signed a contract with UMS to establish a mechanism for funding students.
- *Program Management:* The DHRU's programs and activities have been consistent with the aims of IDEEAL, and working groups within the Unit have begun to coalesce around specific activities such as toolkit development and seminar planning/coordination. (b)(6) (b)(6) will rotate into the position of DHRU Director for the next 2 years. We have continued community outreach by meeting with indigenous communities with PACOS to



pilot the land-use and health toolkit. Outreach to industry partners is ongoing, and we've met with private sector companies who have expressed interest in using the IDEEAL model to evaluate their land use. We will aim to link industry engagement to the DHRU either by having representatives from industry present at symposia or other events, or by extending the DHRU to hold small, targeted meetings in KL that make it easier for industry representatives to attend. In Q4, we anticipate being able to collect meaningful feedback about DHRU value and performance for the end of the project, and in subsequent years beyond the current IDEEAL program period. We will use the OCA plan in our M&E document for guidance in developing a QA evaluation at the end of Y3.

- To date, the DHRU has held eight stakeholder meetings, one public scientific conference on Land Use Change, Health and Economics, two seminars, also open to the public, and two technical workshops open for UMS faculty and students. Meetings have included faculty and students from multiple departments within UMS (consistently from the FBE and FMHS); from Sabah government agencies (e.g. the Sabah Forestry Department, Sabah Wildlife Department, SEDIA, the Department of State Health Sabah and the Natural Resources Office); local NGOs (e.g. HUTAN, PACOS, LEAP, BCI and WWF); and the IDEEAL technical leads from EHA. In November 2016, we plan to give a talk at the RSPO Annual Meeting and organize a side event to promote the IDEEAL project and attract additional stakeholders who may wish to support and utilize the model or toolkits developed.
- *Project Performance Management:* The DHRU has met indicators 1-5 listed in the OCA table. Members understand the aims and activities of the Unit; we have successfully worked in collaboration with stakeholders to develop the quantitative model and toolkits; we are sharing updates on toolkits and models with stakeholders and soliciting feedback to assure that we develop high quality products that will be used by public and private sector stakeholders; we have held several policy meetings with Sabah ministry officials who have indicated an interest in presenting the IDEEAL model to State planning agencies and a white paper at an upcoming Cabinet meeting. We are tracking progress against performance indicators as described in our quarterly reports. We will continue to leverage existing external resources to support DHRU activities (e.g. student research, co-supervision by EHA scientists, collaborative grant writing and publication) beyond the IDEEAL project period, and we continue to seek additional external resources with UMS, and UMS internal funding, to advance the DHRU from Unit to Center, and further expand its profile to advance it to an international Center of Excellence.
- *External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have begun drafting a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated; we have presented on IDEEAL at 8 international scientific meetings. We have submitted an abstract to speak at the One Health Congress and Biennial Congress of the International Association for Ecology and Health in Melbourne, Australia, in December 2016. We've had media engagements, including being interviewed for a TV piece produced by RTM.

## **Sustainability**

- The UMS administration continues to assert its interest in helping elevate the status of the DHRU from being a Unit within an existing center to becoming an independent Center. Our understanding is that once this change is achieved, it will be possible to receive central support from the University to provide administrative and faculty support, and potentially some budget for programmatic activities. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU.
- We have met with private sector stakeholders such as Proctor & Gamble, who have expressed interest in collaborating with and supporting IDEEAL activities beyond the current period of performance; we are also in discussions with J&J and Colgate Palmolive. A proposal for an additional 3 years of support was requested and submitted to Johnson & Johnson and is in review. The CoP and SCL met with USAID Climate Change group in Washington, DC to present an update of IDEEAL activities.

### **Summary**

- The progress made in further developing the DHRU, engaging stakeholders, developing the models and toolkits, holding policy dialogues with Sabah government agencies and other NGOs, and using the DHRU as a forum and avenue for student research has allowed us to stay on track for meeting targets. While there are definitely areas that will require focused effort in what remains of the project period (e.g. private sector buy-in and use of the model in decision making), we are confident that we have laid the groundwork for effective outreach to these groups, with the help of the government, academic and NGO stakeholders who have consistently participated in and supported the DHRU and the aims of IDEEAL.

## **3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES**

### **3.1 Gender Equality and Female Empowerment**

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

### **3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts**

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.



- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby and P&G.
- A proposal was submitted to J&J for future funding.
- Future targets for industry engagement in Malaysia are Cargill, Mars, McDonald's, Unilever, Nestle and GE.
- Looking to use Board support and industry contacts to present IDEEAL to Consumer Goods Forum.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Stakeholders continue to be involved in toolkit development, providing input and comments on content and wording.
- PACOS and BCI are fully engaged in toolkit dissemination plan, with facilitators trained and additional trainings planned.
- Submitted application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District. Application was approved. Human Animal Contact Survey in Telupid started June 2016. DEEP FOREST sampling in Telupid started in July. We have continued engagement with Wilmar and P&G.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- Despite being updated on August 18<sup>th</sup> that (b)(6), this has not happened and UMS is not communicating on this issue.
- Waiting for P&G to provide non-disclosure agreement.

#### 6. COMMUNICATIONS

- Regular meetings and communication with MoH, DVS, PERHILITAN, SWD, DGFC, DSHS and UMS FBE and FMHS regarding available data sets for IDEEAL and the Human Animal Contact Survey. DCoP had repeated communication with PoC at UMS for DHRU, (b)(6) and other faculty, (b)(6) to establish formal agreement to host the DHRU.

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

##### 7.1 Required data gathered to run quantitative model

- Began the drafting of manuscripts describing the methods and results from the modeling activities



- 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed
- Model completely translated to open source software (Python).
- 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners
- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.
  - Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur; have finalized contract to support Masters' students through the DHRU.
  - Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and participation in the EcoHealth/One Health Congress in Melbourne, Australia 2016.
- 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates
- Toolkit outreach and modification will continue. This includes:
    - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
    - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
    - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
    - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
    - Working with stakeholders to conduct toolkit sessions in communities throughout Sabah.
    - Training additional community members as toolkit facilitators.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

Last November, EHA became a member of the Roundtable on Sustainable Palm Oil (RSPO) and sponsored a booth detailing our work in Sabah with scientists fielding questions from various stakeholders including government, industry, and NGOs. EHA

continues to leverage industry contacts to assist in increasing the awareness of our work by presenting at the conference this year.

EHA was unable to present this year at RSPO, but created several communications pieces to help disseminate information regarding the IDEEAL project. We made connections at the RSPO conference this year with the CEO and will work on leveraging our contacts to bring public health to the RSPO agenda.

## 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Sabah Biodiversity Council, Malaysian Palm Oil Board, Malaysian Palm Oil Association, Yayasan Sabah (Sabah Foundation, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers. Sime Darby, Genting Plantations, PepsiCo, Chevron, Coca Cola, Cargill, Johnson & Johnson, Wilmar, Colgate-Palmolive

**Local partners:** Sabah Wildlife Department (SWD), Department of State Health Sabah (DSHS), Universiti of Malaysia Sabah (UMS), Department of Wildlife and National Parks Peninsular Malaysia, Department of Veterinary Services, Ministry of Health, Danau Girang Field Centre, LEAP (Land Empowerment Animals People), (b)(6) Kent University, HUTAN, WWF, Sabah Forestry Department Peninsular Malaysia, Forest Research Institute Malaysia, Borneo Conservation Initiative, Wilmar, other stakeholders to be identified

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media,

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and climate change through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:



*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### **3 - Private partners and industry stakeholders:**

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you with tools necessary to evaluate the potential economic impacts to your company, and to the greater Sabah economy, of infectious disease outbreaks related to land use change implemented by your company. .*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah. Principles from this blueprint can be applied regionally and globally.*

*This project will provide your multinational food and beverage sector companies a blueprint for corporate sustainability and social responsibility around the issue of land use change, palm oil and food production throughout the world.*

### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to advocate for healthy and sustainable land use practices.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and climate change, the global community needs integrated solutions for sustainable development.*



*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.



Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6)

(b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:  
First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J’s sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.



July 2016: CoP signed a contract to fund 3 Masters' students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators' training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.



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FROM THE AMERICAN PEOPLE

Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 4 Quarter 1 – October 15, 2016 to January 14, 2017

Submission Date: May 11, 2017

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to May 31, 2018

(b)(6)

Submitted by: Peter Daszak, Chief of Party

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This document was produced for review by the United States Agency for International Development Regional Development Mission for Asia (USAID/RDMA).

## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 – May 31 <sup>st</sup> 2018
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2016 – January 14, 2017



## LIST OF ACRONYMS

AMCHAM	American Malaysian Chamber of Commerce
CoP	Chief of Party
CSR	Corporate Social Responsibility
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DVS	Department of Veterinary Services
DCoP	Deputy Chief of Party
DG	Director General
DSHS	Department of State Health Sabah
EHA	EcoHealth Alliance
EHS	Environment, Health and Safety
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
GDA	Global Development Alliance
HACS	Human Animal Contact Survey
HIA	Health Impact Assessment
IFC	International Finance Corporation
IOI	Industrial Oxygen Inc.
IR	Indicator Reference
J&J	Johnson & Johnson
LEAF	Lowering Emissions in Asia's Forests
LUCA	Land Use Change Analysis
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health
MOU	Memorandum of Understanding
MPOC	Malaysian Palm Oil Council
NGO	Non-Governmental Organization
PACOS Trust	Partners of Community Organizations Sabah Trust
PERHILITAN	Department of Wildlife and National Parks (Malay)
P&G	Proctor & Gamble
PPP	Public Private Partnership
RDMA	Regional Development Mission for Asia
RTM	Radio Television Malaysia
RSPO	Roundtable on Sustainable Palm Oil
SCL	Stakeholder Coordination Lead
SEDIA	Sabah Economic and Development and Investment Authority

## LIST OF ACRONYMS (CONTINUED)

SFD	Sabah Forestry Department
SM	Senior Modeler
SWD	Sabah Wildlife Department
ToT	Training of Trainers
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
WHO	World Health Organization

## 1.1 Introduction

Under the United States Agency for International Development (USAID) Regional Development Mission for Asia (RDMA) Cooperative Agreement No. AID-486-A-13-00005, titled Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL), EcoHealth Alliance will contribute to the evidence-based knowledge of and multi-sector approach to managing infectious disease emergence and the economics of altered landscapes in the region served by USAID/RDMA.

The period of performance for the US\$500K IDEEAL extension project is December 1, 2016 - May 31, 2018.

## 1.2 Project Summary

Under a cooperative agreement with USAID/RDMA and in partnership with governmental and non-governmental stakeholders, EHA will continue the development of quantitative models relating health costs and potential savings as a function of land use change. In addition, EHA will extend the geographic scope of the project to Sabah, Sarawak, Peninsular Malaysia as well as minor activities to Kalimantan and Thailand. This extension will also support the DHRU in becoming a regionally recognized Center of Excellence, and advance outreach and engagement via our health and land use change toolkit (including adapting the toolkit for new regions). The goal is to bring the lessons learned in the first phase to a regional scale to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society;

build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and continued establish a training, learning, and resource sharing platform in Sabah, Malaysia to sustain project impacts after the project.

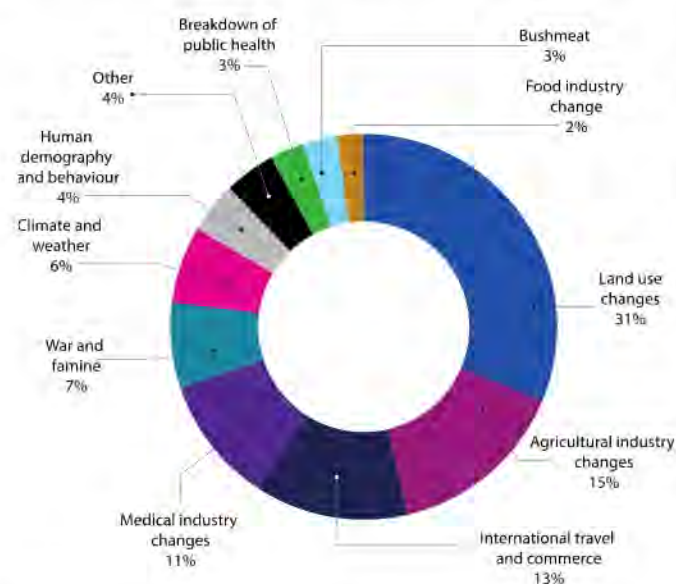


Figure 1. Primary drivers of past disease emergence. Land use change is the most important driver. Source: Loh et al. 2015<sup>1</sup>, UNEP 2016<sup>2</sup>.

<sup>1</sup> Loh, E.H., C. Zambrana-Torrel, K.J. Olival, T.L. Bogich, C.K. Johnson, J.A.K. Mazet, W. Karesh, and P. Daszak. 2015. Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control. *Vector-Borne and Zoonotic Diseases* 15:432–437.

<sup>2</sup> UNEP (2016). UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi.



At the end of the project period, EHA and project partners will have produced three main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision, 2) the Center for Development and Health at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships between land use change and disease emergence and 3) scientific, gender-sensitive, health and environment communications toolkit that incorporates research and modeling results in effective outreach tools for policy makers, private companies, government organizations, and civil society stakeholders.

### 1.3 Summary of Results to Date

Indicators	Year 4			
	Baseline	Exp	Act	Ratio Rating
Output indicator				
Required data gathered to run the quantitative analyses			(b)(4)	
Portfolio of quantitative analyses assessing EID spillover likelihood and damages as a function of land use change				
Develop the DHRU from a unit to a Research Centre at UMS and into a regional center of excellence for additional research, analysis and cross-disciplinary partnerships				
Development of toolkit for communicating the health impacts of differing land use options				
Improved outreach and communication of translated and quantitative resources to policy makers and civil society advocates				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), On going activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- October 18<sup>th</sup> 2016 – Met with (b)(6) who is involved in P&G Environmental Stewardship & Sustainability and (b)(6) from the P&G Palm Sustainability Program postponed as DCOP in hospital.
- November 8<sup>th</sup> – 10<sup>th</sup> 2016 – Attended RSPO in Bangkok and met with industry leaders.
- November 8<sup>th</sup> 2016 – DCOP, (b)(6) from the P&G Palm Sustainability Program to further discuss IDEEAL, P&G Smallholder Risk Assessment model and baseline assessment and ways we can work together.
- November 8<sup>th</sup> 2016 – DCOP briefly discussed IDEEAL with (b)(6) RSPO and agreed to try and meet at RSPO offices in early 2017.
- November 9<sup>th</sup> 2016 – DCoP and (b)(6) from RSPO to further discuss EHA assisting RSPO with their land use change analysis as part of their certification process. This would give us access to aggregate data from plantations around the world about land use change, High Conservation Value Areas etc. Plan to take RSPO LUCA training in early 2017.
- November 9<sup>th</sup> 2016 – EHA hosted reception at RSPO. Attendance is lower than expected but DCOP and SM have productive discussion with Sime Darby staff about potential of using model to better inform where they should expand their operations in Africa.



- November 10<sup>th</sup> 2016 – DCOP, SM, (b)(6) at RDMA to discuss RSPO, IDEEAL video, work plan for extension and data needed.
- November 15<sup>th</sup> 2016 – DCOP met with (b)(6) and (b)(6) from Wilmar to discuss further Wilmar engagement with the IDEEAL project. Discussed expanding model to PM, Thailand and Indonesia potential challenges and data required. Discussed possibility of Wilmar and IDEEAL jointly presenting at European RSPO meeting in London June 2017. Wilmar is planning to expand their operations in Lake Victoria in Uganda and are very interested in using the model to determine the best areas to expand and the best areas to protect.
- November 16<sup>th</sup> 2016 – call with (b)(6) to discuss which countries in Meekong Delta might be easiest to get data from so we can target our efforts.
- November 22<sup>nd</sup> 2016 – DCOP attended the MPOC-SWD Human Wildlife Conflict Workshop at Sandakan. DCOP highlighted using IDEEAL model to strengthen argument for habitat protection to reduce conflict. DCOP briefly discussed IDEEAL with (b)(6) Conservation & Environmental Management Division at Yayasan Sabah and Sarawak Forestry Corporation (b)(6)
- November 23<sup>rd</sup> 2016 – DCOP met with (b)(6) to further discuss issues around DHRU leadership – (b)(6) should become the official head of Unit in January 2017.
- November 23<sup>rd</sup> 2016 - (b)(6) had call with P&G Sustainability (b)(6) to further discuss P&G engagement. Main outcome was (b)(6) suggestion to engage with (b)(6) from P&G Environmental Stewardship & Sustainability program. This was meant to happen in October and is now planned for January 2017 as well as meeting with MPOB.
- November 30<sup>th</sup> 2016 – DCOP met with (b)(6) from UMS to discuss progress with (b)(6) masters and (b)(6) MYHOUN grant for bat work and potential collaboration under PREDICT.
- December 3-7<sup>th</sup> 2016 – Two of the DHRU Masters students presented their posters “Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia” and “Soil – Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah”, EHA Lab Manager presented poster “Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia” at the One Health EcoHealth conference in Melbourne. DCOP gave a talk on IDEEAL “Analyzing the health value of a tropical forest – New strategies to mitigate pandemic prevention”.
- December 5<sup>th</sup> 2016 – COP and DCOP met with (b)(6) to discuss plans for 18 month extension. Plan visit to Thailand in early 2017. (b)(6) to investigate further potential interest for IDEEAL work in Vietnam and Myanmar through mission. Schedule for trip to be confirmed after that.



### 2.1.1 Toolkit Development

- Continue to work to update language and content of toolkit based on feedback from sessions and make images translatable to different settings.

### 2.1.2 Modeling Activities

- Translated land conversion model from Matlab to R code and Python code. In particular, we devoted time to optimize the code to make calculations faster.
- Began spatial and disease data gathering for the study area, as well as development of a spatial database, including metadata, to store the data.
- Continue literature review linking malaria and other vector-borne disease to land use change. This will inform the modeling, in particular the shape of the functions related to change in disease incidence and land development.
- Began drafting of a paper exploring the links of malaria and land cover change in Sabah. This manuscript will include a spatio-temporal model as well as metrics of land cover degradation such as fragmentation.
- Updating economic model by developing a dynamic optimization model
- Ongoing meetings with Department State Health Sabah to negotiate household level malaria disease data sharing.
- Updating spatial model analyzing linkages between land use change and malaria incidence in Sabah.

## 2.2 Implementation challenges

- Spatial data is sparse and quality varies among countries. A country by country analysis will be explored during next quarter to minimize the effect of these issues.

## 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

### 3.1 Gender Equality and Female Empowerment

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.

- A balance of male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (DSHS, SWD and SFD) are engaged. DSHS, SWD, and SFD have offered to supply outbreak and land cover data to IDEEAL modeling team.
- DCoP continuing to develop relationship with Wilmar, Sime Darby, Yayasan Sime Darby, Yayasan Sabah and P&G.
- Proposal to J&J denied, palm oil is a very small part of their core business so aside from supply chain traceability they are not looking to engage in on the ground projects.
- EHA Board member from Colgate offered to help support IDEEAL if the project could identify a government client that is willing to use the model outputs in their land use planning. Consumer goods manufacturers are more interested in government policy change and traceability than land planning tools as they are mainly sourcing derivatives.

## 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- Stakeholders continue to be involved in toolkit development, providing input and comments on content and wording.
- We have continued engagement with Wilmar and P&G.
- Industry involved in toolkit information, supporting toolkit presentations on plantations (Wilmar) and planning additional toolkit information sessions with industry partners and industry support planned.

## 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- DCOP has been told the (b)(6) will become Head of DHRU in January 2017. (b)(6) (b)(6) is acting as Head and helping to move DHRU development forward.
- (b)(6) and DCOP have been working on developing the DHRU website
- DCOP is in process of trying to identify activities for DHRU Research Fellows to be engaged in as consultants a requirement for turning unit in to a center. One idea is to train them to facilitate Toolkit.

## 6. COMMUNICATIONS

- Team will work to put together a video on IDEEAL work for USAID. Interviews will be conducted at RDMA Thailand in Y4. Video is scheduled for completion end of Y4.



## 7 PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### 7.1 Required data gathered to run quantitative model

- Continue working on manuscripts describing the methods and results from the modeling activities
- Identified new sources of economic data to be used in model
- In process of acquiring new disease data to update spatial model
- Malaria household level data

### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Model completely translated to open source software (Python).

### 6.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Identify activities for DHRU Research Fellows to consult on

### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Met with (b)(6) who is involved in P&G Environmental Stewardship & Sustainability
- Toolkit outreach and modification will continue. This includes:
  - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
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with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

Last November, EHA became a member of the Roundtable on Sustainable Palm Oil (RSPO) and sponsored a booth detailing our work in Sabah with scientists fielding questions from various stakeholders including government, industry, and NGOs. EHA continues to leverage industry contacts to assist in increasing the awareness of our work by presenting at the conference this year.

EHA was unable to present this year at RSPO, but created several communications pieces to help disseminate information regarding the IDEEAL project. We made connections at the RSPO conference this year with the CEO and will work on leveraging our contacts to bring public health to the RSPO agenda.

## 8.1 Target audience

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**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Yaysan Sabah, Malaysian Palm Oil Board, Performance Management and Delivery Unit, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)).

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Sabah State Health Department (DSHS), Ministry of Health, Department of Wildlife and national Parks Peninsular Malaysia, Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and improve land use planning through economic incentives, local conservation and public-private partnerships.*

## **2 - Ministries and institutional decision-makers:**

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

## **3 - Private partners and industry stakeholders:**

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

## **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

## **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of*

*disease outbreaks and bad practices in land use planning, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.



May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and

meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6)

(b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce "Emerging and Zoonotic Disease Colloquium" in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:

First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J's sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.



July 2016: CoP signed a contract to fund 3 Masters' students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators' training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.

November 2016: Attended RSPO for second time

Wilmar and Sime Darby have voiced their interest in using model to help determine where they expand their operations in Uganda and Liberia.

December 2016: Participated in the symposium: Linking Public Health and Ecosystem Management; a One Health Approach at the Conference of the Parties - Convention on Biological Diversity. This symposium was highlighted by the Rio Conventions Pavilion Bulletin Vol. 200 No. 35

<http://enb.iisd.org/download/pdf/sd/enbplus200num35e.pdf>

Two of the DHRU Masters students presented their posters "Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia" and "Soil -Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah" EHA Lab Manager presented poster "Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia" at the One Health EcoHealth conference in Melbourne. DCOP gave a talk on IDEEAL "Analyzing the health value of a tropical forest – New strategies to mitigate pandemic prevention".

January 2017:





**USAID** | **ASIA**  
FROM THE AMERICAN PEOPLE

Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 4 Quarter 2 – January 15, 2017 to April 14, 2017

Submission Date: June 9, 2017

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to May 31, 2018

(b)(6)

Submitted by: Peter Daszak, Chief of Party

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This document was produced for review by the United States Agency for International Development Regional Development Mission for Asia (USAID/RDMA).

## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 – May 31 <sup>st</sup> 2018
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	January 15, 2017 – April 14, 2017

## LIST OF ACRONYMS

AmCham	American Chamber of Commerce
BAU	Business as Usual
BoE DDC MPH	Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health
BCI	BC Initiative
CoP	Chief of Party
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DNPWP	Department of National Parks, Wildlife and Plant Conservation, Thailand
DCoP	Deputy Chief of Party
DG	Director General
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FPA UiTM	Faculty of Planation and Agrotechnology, Universiti Teknologi MARA
FRIM	Forest Research Institute Malaysia
GIDEON	Global Infectious Disease and Epidemiology Network
J&J	Johnson & Johnson
KPI	Key Performance Indicators
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health
MPOC	Malaysian Palm Oil Council
MPOB	Malaysian Palm Oil Board
MRD	Ministry of Rural Development
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration



## LIST OF ACRONYMS (CONTINUED)

NGO	Non-Governmental Organization
NMRR	National Medical Research Register
PERHILITAN	Department of Wildlife and National Parks (Malay)
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SMR	Standardized Mortality Ratio
SSHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
ToT	Training of Trainers
UiTM	Universiti Teknologi MARA
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
VCS	Verified Carbon Standard
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature

## 1.1 Introduction

Under the United States Agency for International Development (USAID) Regional Development Mission for Asia (RDMA) Cooperative Agreement No. AID-486-A-13-00005, titled Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL), EcoHealth Alliance will contribute to the evidence-based knowledge of and multi-sector approach to managing infectious disease emergence and the economics of altered landscapes in the region served by USAID/RDMA.

The period of performance for the US\$500K IDEEAL extension project is December 1, 2016 - May 31, 2018.

## 1.2 Project Summary

Under a cooperative agreement with USAID/RDMA and in partnership with governmental and non-governmental stakeholders, EHA will continue the development of quantitative models relating health costs and potential savings as a function of land use change. In addition, EHA will extend the geographic scope of the project to Sabah, Sarawak, Peninsular Malaysia as well as minor activities to Kalimantan and Thailand. This extension will also support the DHRU in becoming a regionally recognized Center of Excellence, and advance outreach and engagement via our health and land use change toolkit (including adapting the toolkit for new regions). The goal is to bring the lessons learned in the first phase to a regional scale to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society;

build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and continued establish a training, learning, and resource sharing platform in Sabah, Malaysia to sustain project impacts after the project.

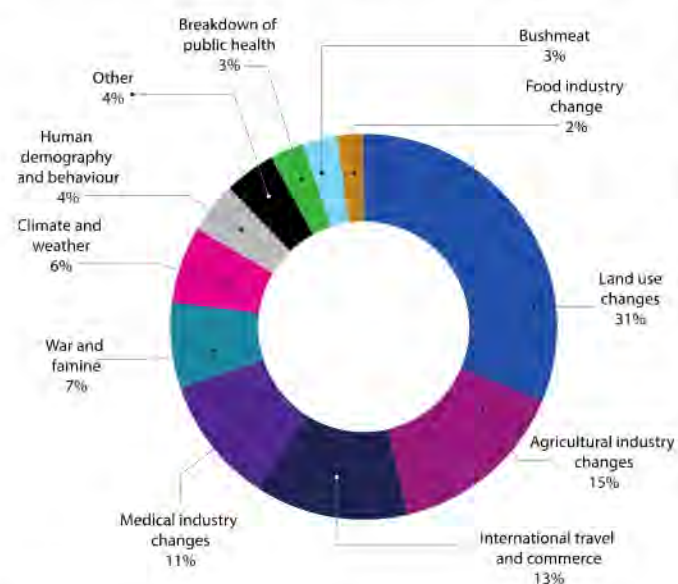


Figure 1. Primary drivers of past disease emergence. Land use change is the most important driver. Source: Loh et al. 2015<sup>1</sup>, UNEP 2016<sup>2</sup>.

<sup>1</sup> Loh, E.H., C. Zambrana-Torrel, K.J. Olival, T.L. Bogich, C.K. Johnson, J.A.K. Mazet, W. Karesh, and P. Daszak. 2015. Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control. *Vector-Borne and Zoonotic Diseases* 15:432–437.

<sup>2</sup> UNEP (2016). UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi.

At the end of the project period, EHA and project partners will have produced three main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision, 2) the Center for Development and Health at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships between land use change and disease emergence and 3) scientific, gender-sensitive, health and environment communications toolkit that incorporates research and modeling results in effective outreach tools for policy makers, private companies, government organizations, and civil society stakeholders.



### 1.3 Summary of Results to Date

Indicators	Year 4			
	Baseline	Exp	Act	Ratio Rating
<b>Output indicator</b>				
Required data gathered to run the quantitative analyses	(b)(4)			
Portfolio of quantitative analyses assessing EID spillover likelihood and damages as a function of land use change				
Develop the DHRU from a unit to a Research Centre at UMS and into a regional center of excellence for additional research, analysis, and cross-disciplinary partnerships				
Development of toolkit for communicating the health impacts of differing land use options				
Improved outreach and communication of translated and quantitative resources to policy makers and civil society advocates				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), Ongoing activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- 16 Jan 2017 - DCoP met with P&G to discuss rescheduling meeting with (b)(6) from P&G Environmental Stewardship & Sustainability program – meeting now planned for February. (b)(6) will invite IDEEAL to a meeting with MPOB in February. Discussed plans for toolkit facilitation training with students from Universiti Teknologi MARA (UiTM) Faculty of Plantations and Agrotechnology (FPA UiTM) who will be involved in the P&G Small Holder Risk Assessment. IDEEAL has been invited to review the surveys used in the assessment and add questions. P&G have other data such as land use maps that they are happy to share with IDEEAL. Discussed plans for presenting toolkit to smallholders and their communities in Johor that are part of the risk assessment May 6-8. P&G will invite Research Fellows from DHRU who have been trained to facilitate the toolkit to conduct the workshop. **This consultation work is one of the Key Performance Indicators for the DHRU and will help with efforts to move the DHRU towards becoming a center at UMS.**
- 18 Jan 2017 - DCoP met with (b)(6) FMHS UMS to discuss the issue of DHRU leadership. (b)(6) has still not had official confirmation of her position as head of DHRU. (b)(6) agrees to the toolkit training in Johor in May and will identify 10 Research Fellows to take part in the facilitation training which is planned for March. (b)(6) proposed that we merge the DHRU with the Rural Medical Research Unit to become a center quicker. Website development is progressing and IDEEAL will now be able to finish editing directly on the UMS site which will speed things up.



- 23 Jan 2017 - SCL had call with P&G Sustainability (b)(6) to further discuss P&G engagement. Main outcome was (b)(6) suggestion to engage with (b)(6) from P&G Environmental Stewardship & Sustainability program.
- 2 Feb 2017 - DCoP presented IDEEAL work to MPOB (b)(6) currently holding advisory role, and (b)(6) (b)(6) Geospatial Unit); (b)(6) from P&G Environmental Stewardship & Sustainability Program; and (b)(6) for Proforest. Presentation was well received but suggested that we should consider value and taxing of downstream products beyond the refinery.
- DCoP met with (b)(6) after MPOB presentation to further discuss IDEEAL work. (b)(6) both say they have and will share data that we need for modeling.
- 23 Feb 2017 - DCoP met with SWD to discuss the Position Paper. They promised to return comments very soon.
- 23 Feb 2017 – DCoP attended International Workshop on Proboscis Monkey Conservation in Sabah. Discussed IDEEAL work with CEO of Yayasan Sime Darby and raised IDEEAL again with. (b)(6) Conservation & Environmental Management Division at Yayasan Sabah, and Sarawak Forestry Corporation (b)(6).
- 24 Feb 2017 - DCoP met with (b)(6). Website changes that were lost can be recovered. The training of DHRU Research Fellows for toolkit facilitation will be March 22 and 23. (b)(6) proposed merging the DHRU with the Rural Medical Research Unit to form the Borneo Medical and Health Research Centre. She thinks this may accelerate the DHRU becoming a Center. SCL and DCoP will follow-up to discuss pros and cons of merger. (b)(6) is organizing **First Borneo Quality of Life Conference 2018** and wants DHRU to be part of the event. **This is another KPI for the DHRU.**
- 3 March 2017 - DCoP met with (b)(6) from P&G to discuss plans for toolkit facilitation training with UiTM students March 27<sup>th</sup> or 28<sup>th</sup>. DCoP to meet with (b)(6) (b)(6) Faculty of Planation and Agrotechnology (FPA UiTM) March 6<sup>th</sup> to discuss further. P&G will cover all local costs for toolkit workshop in Johor in May.
- 6 March 2017 - DCoP met with (b)(6) FPA UiTM at the Oil Palm Price Outlook Conference. Agreed to do toolkit facilitation training March 25<sup>th</sup> and 26<sup>th</sup> with 30-50 students who will be involved in the Smallholder Risk Assessment. Discussed possibility of FPA UiTM becoming more involved with DHRU activities.



- 15 March 2017 - DCoP meeting with Minister of Plantations and Commodities to present the IDEEAL work cancelled at last minute. (b)(6) at MPOC says the meeting will be rescheduled later in the year.
- 21 March 2017 - (b)(6) of SSHD to discuss issues with the Malaria data provided in January. (b)(6) of Vector Unit (replaced (b)(6) who had been moved to Putrajaya the week before) was not aware of the agreement to share data, therefore (b)(6) is unable to assist until this is resolved. We also learned that data prior to 2003 has been lost due to computer failure, but might be available in Putrajaya.
- 22 March 2017 - DCoP and Stakeholder Lead met with RDMA to brief them on project progress and discuss plans for Indonesia and Thailand.
- 22 March 2017 - DCoP, SCL, and RDMA (b)(6) met with (b)(6) from Department of National Parks, Wildlife and Plant Conservation (DNPWP) to discuss IDEEAL project and expanding work to Thailand. DNPWP responsible for protected areas, forest reserves managed by Forestry Department, both are under Ministry of Natural Resources. Planning and Policy Division of Ministry of Natural Resources should have data for ecosystem costs. Surge of Malaria cases in Northern part of Thailand where people are involved in Rosewood exaction. Increase in rubber price is driving increase in land clearing for rubber expansion.
- 22 March 2017 - DCoP, SCL, and RDMA (b)(6) Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health (BoE DDC MPH). (b)(6) is interested in collaborating on IDEEAL. For Malaria, she feels best area to work would be Mae Sot, a district in Western Thailand in Tak Province that shares a border with Myanmar to the West. Ministry of Agriculture would be best source for development of data. Also, the Land and Development Department - [http://www.ddd.go.th/ddd\\_en/](http://www.ddd.go.th/ddd_en/). DCoP to share details of data needed with DNPWP and BoE DDC MPH. Next meetings planned for early May.
- 22-23 May 2017 - Conducted toolkit facilitation training at FMHS UMS with Research Fellows from DHRU. Total of 13 people trained: 6 UMS staff, 6 UMS students and 1 EHA staff member. 2 DHRU Research Fellows will be identified to assist with P&G training on May 6<sup>th</sup> and 7<sup>th</sup>.
- 25 March 2017 - DCoP presented IDEEAL work to staff from FPA UiTM, Wild Asia and Proforest. Wild Asia have 7 projects with smallholders: 5 in Sabah and 2 in PM. Both Wild Asia and Proforest are working with P&G and UiTM on the smallholder risk assessment.
- 25-26 March 2017 - Toolkit workshop at UITM FPA. Total of 35 people trained: 32 students from FPA who will be involved in risk assessments, Proforest Regional Coordinator and Wild Asia's Project Coordinator and Operation Lead. This had initially



been planned as Toolkit facilitation training, but level of understanding and skill set of students meant it was necessary to make it a toolkit workshop.

- 28 March 2017 - DCoP, Community Engagement Coordinator and Spatial Modeler met with Yayasan Sime Darby (b)(6) regarding IDEEAL project. DCoP presented IDEEAL work and (b)(6) agreed to provide an introduction to (b)(6) Group Sustainability and Quality Management at Sime Darby. IDEEAL was invited to give a talk and present the toolkit at their Environment Day in Kuala Lumpur on May 9<sup>th</sup>, with several thousand anticipated attendees.
- 28 March 2017 - DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6) from P&G and (b)(6) from Proforest to discuss data needed for modeling and toolkit workshop in Johor in May. Toolkit is planned for the Pontian Kecil site managed by Proforest. The workshop will be held at a community center with approximately 100 people expected to attend.
- 29 March 2017 - DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6) of Vector Unit for SSHD, who is now (b)(6) of Malaria at MoH DCD. He has discussed with (b)(6) of Vector Unit, who will now share the Sabah data and answer our questions. For PM and Sarawak data, MoH are happy to share, but we will have to update our NMRR (National Medical Research Register) approval before MoH can share with us. Prior to 2014 for PM, they have data based on residence of cases. After 2014, both residence and place of infection are recorded. Does not know if they have missing data from Sabah.
- 31 March 2017 - Submitted abstract for IDEEAL talk to Prince Mahidol Award Conference “Analyzing the economics of disease emergence from deforestation to support better practices in the extractive industries and reduce pandemic risk.”
- 4 April 2017 - DCoP met with Assistant Director SWD who again promises to review Position Paper, and will remind Minister of Tourism Culture and Environment at a meeting later that day that it is close to completion.
- 7 April 2017 - DCoP met with new (b)(6)  
(b)(6)  
(b)(6) Discussed the PREDICT and IDEEAL projects and ways the Embassy can assist.

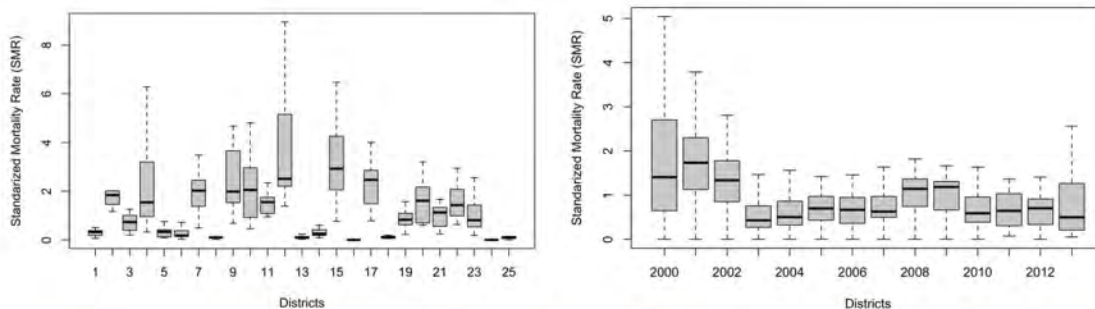
### 2.1.1 Toolkit Development

- Trained 6 faculty and 6 graduate students at UMS as facilitators of health impacts of land use toolkit. This supports toolkit dissemination, as well as strengthening DHRU. DHRU facilitators will work to present the toolkit to stakeholders and industry partners in May.
- Presented toolkit to 35 participants at FPA UiTM. This training has been developed through our partnership with P&G. Students trained are studying agricultural sciences and most will be working directly on plantations as managers, providing a wide reach for

the IDEEAL project. As this was a new topic, UiTM students were not trained as facilitators as originally planned; additional training will hopefully happen at a later date.

### 2.1.2 Modeling Activities

- Identified new sources of data and information related to palm oil derivative production and ecosystem services to inform economic model.
- Developed outline of the dynamic economic modeling paper and its application in Sabah, currently under active writing
- Developing spatial panel econometric (25 districts and 13 years) and conditional autoregressive models linking Malaria incidence and land use change. Figures below describe the variation of Malaria Standardized Mortality Ratios (SMR) by districts over 13 years (left) and by years across all Sabah districts (right).



SMR was calculated based on the number of Malaria cases reported by year and district. To understand the links between Malaria outbreaks and land use change, we are using SMR as dependent variable for the spatial panel econometric model and different exploratory variables such as deforestation metrics, fragmentation, different land cover types, and climatic variables (precipitation).

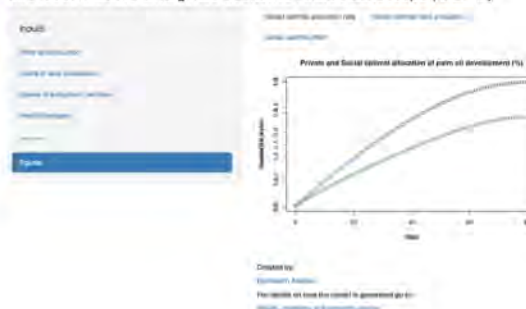
- Developed a draft of an R Shiny App (currently offline) that contains tools to implement the dynamic optimization model. A further refinement of the tools is expected in the next 2 quarters. The figures below, show two of the screenshots from the R Shiny App. The figure on the left shows the initial page in which values are loaded, and the figure on the right shows the results of the model after the optimization process.



Infectious Disease Emergence Economic Altered Landscape (IDEAL)



Infectious Disease Emergence Economic Altered Landscape (IDEAL)



This draft R Shiny App allows to modify the dynamic model as we see appropriate. We can feed in values for total area, forest area, palm oil price, yield of palm oil per hectare, discount rate, and number of years. As we modify these values, the model re-optimizes the optimal path for the new values. In the next quarters, we plan to incorporate prices for different types of palm oil output, different values for ecosystem services, and potential health damages from Malaria. The output (figure on the right), shows after the optimization, the rate of transformation for the social and private optimal allocation for those specific values.

- Met with Malaysian Ministry of Health and Sabah Health Department to discuss disease (Malaria, Leptospirosis) data sharing to 1) update the model in Sabah; and 2) extend the model to Sarawak and Peninsular Malaysia.

## 2.2 Implementation challenges

- Leadership issues at DHRU and the avoidance by UMS senior management to discuss such issues. Two of the three students are struggling to access funds for field work. Despite this, DHRU is developing and students are making progress with their Masters' research.
- Website development for DHRU has taken far longer than expected, despite technical problems this quarter, it should go live in the next quarter following approval of all parties.
- Poor communication between P&G and UiTM complicated planning and implementing of Toolkit training.
- SWD has taken a long time to provide feedback on Position Paper for Sabah Cabinet.
- Malaria data in Sabah is missing for some years as they were lost when the Sabah Health Department moved its headquarters in ~2009.
- Malaria data prior to 2000 is in process of being digitized, this may cause delays in obtaining all of the data, as have staff changes.

## 2.3 M&E Update

- *DHRU External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have drafted a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated. We have presented on IDEAL at international scientific



meetings and have had media engagements, including being interviewed for a TV piece produced by RTM which will be aired later this year.

- *DHRU Sustainability:* IDEEAL will need to further discuss (b)(6) proposal of merging the DHRU with the Rural Medical Research Unit to form the Borneo Medical and Health Research Centre. Our understanding is that once this change is achieved, it will be possible to receive central support from the University to provide administrative and faculty support, and potentially some budget for programmatic activities. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU.
- P&G have agreed to support all local costs for Toolkit activities May 6<sup>th</sup> and 7<sup>th</sup> including costs of flying DHRU Research Fellows to Johor.
- Exploring possibility of FPA UiTM becoming more involved in DHRU activities.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars and trainings.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Equal participation of men and women in toolkit audiences achieved.

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (SSHD, SWD and SFD) are engaged.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby, Sime Darby and P&G.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- P&G are actively participating on project activities as are FPA UiTM. Ongoing discussions with Wilmar and Yayasan Sime Darby.
- MPOC helped set-up a meeting with Minister of Plantations and Commodores that had been cancelled at the last minute. MPOC says meeting will be rescheduled.
- Sarawak Forestry Corporation and Sarawak State Health Department have voiced their interest in the IDEEAL work.

- Wilmar involved in toolkit information, supporting toolkit presentations on plantations and planning additional toolkit information sessions with industry partners and industry support.

## 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- Despite being updated on August 18<sup>th</sup> that (b)(6) this has not officially happened and UMS is not communicating on this issue.

## 6. COMMUNICATIONS

Team will work to put together a video on IDEEAL work for USAID. Interviews will be conducted at RDMA Thailand in Y4. Video is scheduled for completion end of Y4.

## PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### 7.1 Required data gathered to run quantitative model

- Continue working on manuscripts describing the methods and results from the modeling activities
- In process of acquiring new disease data in peninsular Malaysia and Sarawak to update spatial model. Waiting for government approval.
- Meetings with local governmental and academic institutions to create identify potential data sources and collaborations for model extension in Indonesia and Thailand.
- Target and define potential study area (districts) in Thailand for model extension based on availability and quality of disease and extractive industry data. Begin data acquisition.

### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Model completely translated to open source software (Python and R).
- Updating spatial model linking Malaria incidence and land use change by implementing conditional autoregressive models.
- Updating economic model incorporating new industry data and implementing data panel econometric modeling.
- Further develop web app for economic optimization model.

### 6.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.



- Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur. Will consider (b)(6) proposal for merging the DHRU with the Rural Medical Research Unit to form the Borneo Medical and Health Research Centre.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and will assist with planning for First Borneo Quality of Life Conference 2018 that both (b)(6) will present.
- UMS faculty to be trained as toolkit facilitators to present toolkit in partnership with P&G activities.
- Review of DHRU Masters' students' progress.

#### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Toolkit outreach and modification will continue. This includes:
  - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
  - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
  - Working with stakeholders to conduct toolkit sessions in communities throughout Malaysia
  - Training additional community members as toolkit facilitators.
- Presenting toolkit to group of smallholder farmers in peninsular Malaysia as part of a collaboration with P&G and other stakeholder NGOs. UMS faculty will present the toolkit to the group, helping to strengthen the DHRU.
- Presenting talk on IDEEAL and toolkit activities at Yayasan Sime Darby Environment Day in Kuala Lumpur, a day-long event focused on environment and sustainability with expected attendees from government, industry, schools, and the general public expected to attend.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content,



presentations at scientific and professional meetings, and opportunistic public outreach through news media.

Last November, EHA became a member of the Roundtable on Sustainable Palm Oil (RSPO) and sponsored a booth detailing our work in Sabah with scientists fielding questions from various stakeholders including government, industry, and NGOs. EHA continues to leverage industry contacts to assist in increasing the awareness of our work by presenting at the conference this year.

EHA was unable to present this year at RSPO, but created several communications pieces to help disseminate information regarding the IDEEAL project. We made connections at the RSPO conference this year with the CEO and will work on leveraging our contacts to bring public health to the RSPO agenda.

IDEEAL may attend ERSPO to present our efforts with Wilmar.

#### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Yaysan Sabah, Malaysian Palm Oil Board, Performance Management and Delivery Unit, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)), Ministry of Health Malaysia, Ministry of Public Health Thailand.

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Sabah State Health Department (SSHD), Ministry of Health, Department of Wildlife and national Parks Peninsular Malaysia, Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

#### 8.2 Messages

##### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and improve land use planning through economic incentives, local conservation and public-private partnerships.*

## **2 - Ministries and institutional decision-makers:**

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

## **3 - Private partners and industry stakeholders:**

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

## **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

## **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of*

*disease outbreaks and bad practices in land use planning, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by David Gaveau for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.



May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and

meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6)

(b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce "Emerging and Zoonotic Disease Colloquium" in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:

First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J's sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.



July 2016: CoP signed a contract to fund 3 Masters' students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators' training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.

November 2016: Attended RSPO for second time

December 2016: Participated in the symposium: Linking Public Health and Ecosystem Management: a One Health Approach at the Conference of the Parties - Convention on Biological Diversity. This symposium was highlighted by the Rio Conventions Pavilion Bulletin Vol. 200 No. 35

<http://enb.iisd.org/download/pdf/sd/enbplus200num35e.pdf>

Two of the DHRU Masters students presented their posters "Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia" and "Soil - Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah;" EHA Lab Manager presented poster "Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia" at the One Health EcoHealth conference in Melbourne. DCoP gave a talk on IDEEAL "Analyzing the health value of a tropical forest - New strategies to mitigate pandemic prevention".

January 2017: P&G agreed to use DRU Research Fellows to present Toolkit Workshop in May, which is a KPI for DHRU becoming a Centre.

February 2017: Presented IDEEAL work to MPOB, P&G including Dr. from P&G Environmental Stewardship and Sustainability program and (b)(6) (b)(6) for Proforest.

Attended International Workshop on Proboscis Monkey Conservation in Sabah. Discussed IDEEAL work with CEO of Yayasan Sime Darby and raised IDEEAL again with Yayasan Sabah and Sarawak Forestry Corporation.

March 2017: First meetings in Thailand to discuss expansion of IDEEAL work with DNPWP and BoE DDC MPH.

April 2017: IDEEAL met with new (b)(6)

(b)(6)



(b)(6)

and had a lengthy discussion about IDEEAL and PREDICT work.



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# Infectious Disease Emergence and Economics of Altered Landscapes Quarterly Report

Year 4 Quarter 3 – April 15, 2017 to July 14, 2017

Submission Date: October 13, 2017

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to May 31, 2018

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

**Program Name:** Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)

**Activity Start Date And End Date:** October 15<sup>th</sup> 2013 – May 31<sup>st</sup> 2018

**Name of Prime Implementing Partner:** EcoHealth Alliance

**[Contract/Agreement] Number:** AID-486-A-13-00005

**Major Counterpart Organizations** Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department

**Geographic Coverage (cities and or countries)** Sabah, Malaysia

**Reporting Period:** April 15, 2017 – July 14, 2017



## LIST OF ACRONYMS

AmCham	American Chamber of Commerce
BAU	Business as Usual
BoE DDC MPH	Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health
BCI	BC Initiative
CoP	Chief of Party
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DNPWP	Department of National Parks, Wildlife and Plant Conservation, Thailand
DCoP	Deputy Chief of Party
DG	Director General
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FPA UiTM	Faculty of Planation and Agrotechnology, Universiti Teknologi MARA
FRIM	Forest Research Institute Malaysia
GIDEON	Global Infectious Disease and Epidemiology Network
J&J	Johnson & Johnson
KPI	Key Performance Indicators
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health
MPOC	Malaysian Palm Oil Council
MPOB	Malaysian Palm Oil Board
MRD	Ministry of Rural Development
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NMRR	National Medical Research Register
PERHILITAN	Department of Wildlife and National Parks (Malay)
RDMA	Regional Development Mission for Asia

## LIST OF ACRONYMS (CONTINUED)

RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SMR	Standardized Mortality Ratio
SSHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
ToT	Training of Trainers
UiTM	Universiti Teknologi MARA
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
VCS	Verified Carbon Standard
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature

## INTRODUCTION

Under the United States Agency for International Development (USAID) Regional Development Mission for Asia (RDMA) Cooperative Agreement No. AID-486-A-13-00005, titled Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL), EcoHealth Alliance will contribute to the evidence-based knowledge of and multi-sector approach to managing infectious disease emergence and the economics of altered landscapes in the region served by USAID/RDMA.

The period of performance for the US\$500K IDEEAL extension project is December 1, 2016 - May 31, 2018.

## PROJECT SUMMARY

Under a cooperative agreement with USAID/RDMA and in partnership with governmental and non-governmental stakeholders, EHA will continue the development of quantitative models relating health costs and potential savings as a function of land use change. In addition, EHA will extend the geographic scope of the project to Sabah, Sarawak, Peninsular Malaysia as well as minor activities to Kalimantan and Thailand. This extension will also support the DHRU in becoming a regionally recognized Center of Excellence, and advance outreach and engagement via our health and land use change toolkit (including adapting the toolkit for new regions). The goal is to bring the lessons learned in the first phase to a regional scale to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society; build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and continued establish a training, learning, and resource sharing platform in Sabah, Malaysia to sustain project impacts after the project.

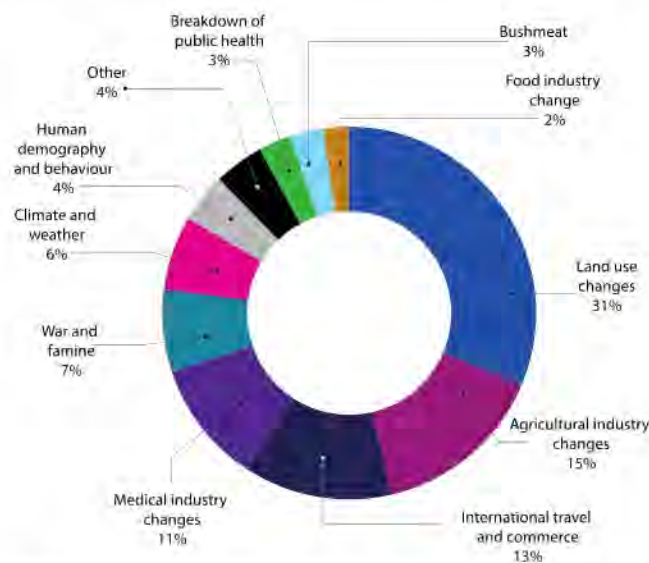


Figure 1. Primary drivers of past disease emergence. Land use change is the most important driver. Source: Loh et al. 2015<sup>1</sup>, UNEP 2016<sup>2</sup>.

<sup>1</sup> Loh, E.H., C. Zambrana-Torrel, K.J. Olival, T.L. Bogich, C.K. Johnson, J.A.K. Mazet, W. Karesh, and P. Daszak. 2015. Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control. *Vector-Borne and Zoonotic Diseases* 15:432–437.

<sup>2</sup> UNEP (2016). UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi.



At the end of the project period, EHA and project partners will have produced three main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision, 2) the Center for Development and Health at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships between land use change and disease emergence and 3) scientific, gender-sensitive, health and environment communications toolkit that incorporates research and modeling results in effective outreach tools for policy makers, private companies, government organizations, and civil society stakeholders.

## SUMMARY OF RESULTS TO DATE

Indicators	Year 4			
	Baseline	Exp	Act	Ratio Rating
<b>Output indicator</b>				
Required data gathered to run the quantitative analyses			(b)(4)	
Portfolio of quantitative analyses assessing EID spillover likelihood and damages as a function of land use change				
Develop the DHRU from a unit to a Research Centre at UMS and into a regional center of excellence for additional research, analysis, and cross-disciplinary partnerships				
Development of toolkit for communicating the health impacts of differing land use options				
Improved outreach and communication of translated and quantitative resources to policy makers and civil society advocates				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), Ongoing activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### PROGRESS NARRATIVE

- April 20<sup>th</sup> – SWD provide feedback on Position paper. EHA will now work towards preparing final draft.
- April 28<sup>th</sup> – DCoP met with (b)(6), (b)(6), (b)(6), Department Of Veterinary Services to discuss EHA work in Malaysia including the expansion of the IDEEAL project to include Peninsular.
- May 1<sup>st</sup> – DCoP, (b)(6), (b)(6) Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health Thailand to discuss IDEEAL expansion in Thailand. Discussed the data sets needed in Thailand, who has what data and the potential challenges to expand the IDEEAL work to Thailand. The main challenge will be the language barrier and that most data is only available in Thai. For health data we can get most of what we need from Ministry of Public Health Thailand but will need to sign a data transfer agreement. Population data from Ministry of Interiors. There are 77



provinces we will need to identify provinces after doing preliminary review of data available to identify areas with land use change data over last 20 years and good disease data. Per person treatment cost (private + public): in patient & outpatient: Will need to get from Department of medical services or reviewing of literature. Once we identify district we can get data from community hospital. In patient cost/day of occupied bed (e.g. gloves, food, diagnostic, treatment): Department of medical services or reviewing of literature may find this number. Days of worked missed/wages lost due to disease: Department of medical services or reviewing of literature may find this number. Costs of detection: Once we identify province or district then we can get data directly from them. Costs of vector control (bed nets, fogging/spraying): Need to identify province or district we will work in first. Epidemiological investigation: we can ask Bureau of Epidemiology investigation unit to explore the cost. Educational material; Bureau of risk communication and relevant bureau to find this answer. Number of workers assigned to control/prevention strategies: we need to go to bureau of human resources at Department of Disease Control, but we will only get the number from Department of Disease Control. Wages of workers assigned to control/prevention strategies: we need to go to bureau of human resources at Department of Disease Control,

- May 2<sup>nd</sup> – DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6). In Thailand Malaria going down but during land clearing get spike. Need to consider mosquito species. No single data base for Malaria data. Bureau of Epidemiology to make introductions at province level. Hospital cases and Malaria posts will have 20% overlap in cases. Thailand has 40 years of Malaria data but incidence data from 2000 onwards.
- May 2<sup>nd</sup> - DCoP, Community Engagement Coordinator, Spatial Modeler, (b)(6) - Faculty of Forestry, Kasetsart University to discuss collaborating on IDEEAL and the data sets needed for the modeling. Land use data available at Province level. Dept of Land Development – Ministry of Ag has land use data going back to 2000. Faculty of Forestry has deforestation data. Office of National Policy for Environmental Impact Assessments for development projects. Will need letter of agreement between EHA and Faculty. For costs of rubber – contact rubber institute. Costs and Benefits of Palm Oil Production – Bureau of Agriculture and Economy. Ministry of Energy for types of oil produced. Ecosystem Services – Ministry of Natural Resources. Maintenance of wildlife habitat - Dept of National Parks. Recreation and tourism – Ministry of Tourism. Health damages – Ministry of Public Health. Spatial data – Ministry of agriculture and Faculty of Forestry.
- May 3<sup>rd</sup> - Community Engagement Coordinator and Spatial Modeler attended the P&G Baseline Assessment & Scorecard Standardization Workshop. The meeting was attended by representatives from P&G, Malaysia Institute For Supply Chain Innovation, Felda Global Ventures, Proforest, Wild Asia, UiTM, MIMOS and the Malaysian Palm Oil Board. The goal of this workshop was to help P&G improve on their traceability of palm oil produced by discussing relevant information that should be collected as well as incentives to promote MPOB certification of smallholders. This was an opportunity to see how IDEEAL work might feature into future assessments and meet with potential stakeholders about partnerships and data sharing.



- May 4<sup>th</sup> – DCoP gave talk on IDEEAL and PREDICT work in Malaysia at launch of the DTRA funded “Serological Biosurveillance for Spillover of Henipaviruses and Filoviruses at Agricultural and Hunting Human-Animal Interfaces in Peninsular Malaysia Project.” This meeting was attended by 50 people from the US Embassy, DTRA CBEP, Ministry of Health, Department of Veterinary Services, PERHILITAN, Universiti Putra Malaysia and Universiti Malaysia Sabah and was an excellent opportunity to update our partners on progress with IDEEAL and the expansion of the project to Peninsular Malaysia.
- May 4<sup>th</sup> – DCoP met with (b)(6) General Ministry of Health, to discuss access to health data needed for the IDEEAL modeling on Peninsular Malaysia. (b)(6) is happy to assist IDEEAL with this effort.
- May 7<sup>th</sup> – EHA Field Manager, Community Engagement Coordinator and Spatial Modeler presented toolkit to 24 smallholder oil palm farmers in Kampung Sungai Jambi, Johor, Malaysia. As part of this presentation, two trained facilitators from the DHRU presented the toolkit to the smallholders with assistance from EcoHealth Alliance staff. This is one of the deliverables for the DHRU and will assist in its establishment as a center. P&G covered the costs of organizing the training as well as costs for the DHRU facilitators.
- May 9<sup>th</sup> - Yayasan Sime Darby’s Environment Day. Community Engagement Coordinator gave a talk “Analyzing the Health Value of a Tropical Forest – New strategies to mitigate Pandemic Potential” to around 20 people. Presented toolkit activities to 3 teachers and 15 children. . EHA also had a booth handing out materials about IDEEAL and PREDICT and discussing our work with members of the public.
- May 18<sup>th</sup> – DCoP gave a talk “Promoting One Health & Conservation through Zoonotic Disease Surveillance: The PREDICT & IDEEAL Projects in Malaysia” at the 3rd Borneo Tropical Medicine and Infectious Disease Congress 2017.
- May 18<sup>th</sup> – DCoP met with (b)(6) based at Sarawak General Hospital and (b)(6) from Hospital Sarikei to discuss the IDEEAL project in Sarawak. They agreed to help facilitate a meeting with (b)(6) as DCoP has not had any response to previous emails.
- May 19<sup>th</sup> – DCoP met with (b)(6) for Wilmar to discuss the proposal for the “Optimization of Land Development Based on Ecosystem Services Valuation for Kalangala, Uganda”. The proposal has been reviewed by (b)(6) for Africa and Asia and Isaac Abban-Mensah, Africa Sustainability Controller. (b)(6)



requested that DCoP attend EURT to discuss proposal in person with (b)(6) and thinks IDEEAL should be represented at the PONGO meeting on June 14<sup>th</sup> after EURT. The Palm Oil & NGO (PONGO) Alliance was founded in 2015 and will be officially launched in June 2017. The Alliance's mission is to support the management of orangutans and other wildlife within oil palm landscapes. (b)(6) confirms that Wilmar will continue to provide accommodation and food for Deep Forest sampling in Telupid.

- June 13<sup>th</sup> – DCoP attends the RSPO fifth annual European Roundtable (EURT) event in London with over 400 delegates.
- June 13<sup>th</sup> – DCoP meets with (b)(6) for Wilmar at EURT. Wilmar had further discussed the proposal internally following DCoP last meeting on May 19<sup>th</sup> in KL. (b)(6) for Africa have voiced their support for the proposal. At EURT (b)(6) was also very excited by the proposal. Wilmar are not now planning any expansion on the Kalangala Island on Lake Victoria. Following their internal meeting they would like to know if we can amend the proposal to look at Nigeria which will be focus of Wilmar palm oil expansion for next 10 - 20 years. Wilmar currently own six separate estates in the Cross River State in Nigeria near Cameroon border, totaling just under 29,000ha. The six estates are in the Akampa, Biase, Odukpani and Akpabuyo Local Government areas. They are in the process of looking for additional suitable lands for oil palm plantation development in these local government areas if they are available and ask if we can amend the proposal to evaluate the 4 areas and make similar recommendations as detailed in the first proposal for all 4 areas. This operation is 80% owned by Wilmar so will be easier to implement IDEEAL analysis than in Uganda. This could be a really good opportunity for IDEEAL work to impact on land use planning. Wilamr also ask that as we move forward with this that we consider ways of combining this analysis with current baseline and HCV assessments required by RSPO so they can incorporate the IDEEAL analusis into future land assessments.
- June 13<sup>th</sup> – DCoP meets with (b)(6) suggest that Liberian government would be very interested in using the IDEEAL model to help develop their agricultural sector. He offered to make introductions to the Environment Minister if he still has a job after the election. DCoP and (b)(6) will have a proper meeting in KL soon.
- June 14<sup>th</sup> – DCoP attends the first official Palm Oil & NGO (PONGO) Alliance meeting. DCoP highlights the work being done through IDEEAL and the potential for the modeling activities to assist with the aims of PONGO.
- June 14<sup>th</sup> – DCoP meets with (b)(6) for Sime Darby. (b)(6) is interested to learn more about the land evaluation we are planning with Wilmar and might be able to help with IDEEAL data for Sabah and Peninsular Malaysia.



DCoP and (b)(6) will have a proper meeting in KL in the next few weeks to discuss IDEEAL further.

- June 14th – DCoP meets with (b)(6) for Musim Mas - she is based in Singapore but DCoP plans to meet with her next time she is in KL to discuss IDEEAL further, she is also interested to learn more about the land evaluation we are planning with Wilmar and might be able to help with data for Indonesia.
- June 14th – DCoP meets with (b)(6) Group Public Relations for Olam who will put IDEEAL in touch with their sustainability team.
- June 14th – DCoP meets with (b)(6) RSPO, who is organizing the next RSPO conference in Bali and we are hoping to convince her to give us a slot to talk about IDEEAL.
- June 21<sup>st</sup> – DCoP meets with RTM producers to review final edits to the 2 episodes of Rona Sabah that will feature IDEEAL and PREDICT work in Sabah.
- June 21<sup>st</sup> – DCoP meets with (b)(6) who has finally been confirmed as the official Head of the DHRU following discussions with (b)(6) of UMS for next 5 years and wanted to extend his apologies for how things have been over last 12 months. UMS are aware that they have not lived up to their end of the bargain and we should see a real change moving forward with (b)(6) in charge. DHRU will now be placed under Research and Innovation Center not EcoCampus which will make it easier to access funds and manage the Unit. After further discussion DCoP and (b)(6) decided not to move the DHRU to Borneo Medical and Health Research Centre at this time as we do not know who will lead new center and feel that we have a good chance of developing the DHRU into a Centre. (b)(6) thinks involving other universities like Kasetsart University, UiTM and UNIMAS is a good idea.
- June 22<sup>nd</sup> – DCoP meets with (b)(6) Sabah Forestry Department and updates him on progress with IDEEAL.
- June 22<sup>nd</sup> – DCoP meets with (b)(6), US Army Chief, Office of Defense Cooperation. (b)(6), US Army Chief, Office of Defense Cooperation and (b)(6) to brief them on the PREDICT and IDEEAL projects and to discuss potential assistance from the US Embassy.
- July 4<sup>th</sup> – DCoP meets with (b)(6) to discuss DHRU. UMS is happy with IDEEAL website we just need to make final changes before we share with USAID. Progress review of the 3 DHRU students' planned for July 21<sup>st</sup>. The 3 students will submit



abstracts to talk about their research at the BQSL conference in Jan. DCoP will give a talk on IDEEAL. Began planning for next IDEEAL stakeholder meeting in September.

- July 4<sup>th</sup> – DCoP meets with (b)(6) of the Vector Unit at SSHD and he agrees to provide the District level Malaria data we have been trying to get since March.
- July 5<sup>th</sup> – DCoP attends US Embassy Independence Day celebrations and (b)(6) on the latest PREDIC and IDEEAL developments. (b)(6) reaffirms her support for both the IDEEAL and PREDICT projects and requests another meeting in coming weeks.

#### 2.1.1 Toolkit Development

- May 7<sup>th</sup> - Presented toolkit to 24 smallholder oil palm farmers in Kampung Sungai Jambi, Johor, Malaysia. As part of this presentation, two trained facilitators from the DHRU presented the toolkit to the smallholders with assistance from EcoHealth Alliance staff. This is one of the deliverables for the DHRU and will assist in its establishment as a center. P&G covered the costs of organizing the training as well as costs for the DHRU facilitators.
  - EcoHealth Alliance's 6 new rangers also participated in the toolkit session and activities to familiarize them with the IDEEAL project and train them as facilitators.
  - Around 5 UiTM students who were previously exposed to the toolkit; and observed the presentation. This outreach was organized in part as a collaboration between P&G and Wild Asia.
- May 9<sup>th</sup> - Yayasan Sime Darby's Environment Day. Presented toolkit activities to 3 teachers and 15 children. This is the first time the toolkit has been implemented for elementary student audiences. EHA also had a booth handing out materials about IDEEAL and PREDICT and discussing our work with members of the public.
- Discussed possible future outreach events and activities in Peninsular Malaysia with industry partners.

#### 2.1.2 Modeling Activities

- Identified and downloaded additional data on ecosystem services and their estimated values from Economics of Ecosystems and Biodiversity data (TEEB). Conducted literature review to complement database with additional ecosystem service value data for the region, adding approximately 50 new values to our ecosystem services data.
- Estimated the country-specific ecosystem services values for carbon storage for Malaysia, Indonesia, and Thailand, using InVest software. This will allow more precise

estimation of ecosystem service values for each area in the study region. Valuation of additional ecosystem services and mapping of value is planned for Q3.

- Defined potential study area (provinces) in Thailand for regional model based on availability and quality of disease and extractive industry data.
- Met with Malaysian Ministry of Health and Sabah Health Department to discuss disease (malaria, leptospirosis) data sharing to 1) update the model in Sabah; and 2) extend the model to Sarawak and Peninsular Malaysia.
- Reached out to Ministry of Public Health Thailand and University of Kasetsart's Faculty of Forestry to establish institutional liaisons for data sharing and research collaboration.
- Conducted brief literature review to identify land use related diseases of interest and relevant industries in Thailand. Established malaria and rubber production as system of interest for model extension since information on malaria is abundant and readily available and rubber plantations present similar scenarios to palm oil production, facilitating the model transfer between systems. Provinces for local model to be determined after conversation with local partners and exploring available data.
- Identified potential health and land use/land cover data sources to extend the model to the Thailand rubber-malaria context.
- Reached out to INDOHUN through USAID-Indonesia and discussed potential collaboration in Indonesia as both teams are interested in developing economic models to assess the potential health impacts of industries.

#### IMPLEMENTATION CHALLENGES

- Leadership issues at DHRU have now been solved with the official appointment of (b)(6) of the DHRU. The DHRU will now be placed under Research and Innovation Center not EcoCampus which will make it easier to access funds and manage the Unit.
- Website development for DHRU has taken far longer than expected, despite technical problems this quarter, it should go live in the next quarter following approval of all parties.
- Poor communication between P&G and UiTM complicated planning and implementing of toolkit session with smallholders. After the session, participants expressed interested in having future sessions with more advance notice and at different times adjusting for common work schedules.
- SWD has now provided feedback on Position Paper but this delay will delay the submission of the Position paper further.



- We still have not received the required District level Malaria data but we hope to get it early in next quarter following DCoP last meeting with (b)(6).

#### M&E UPDATE

- *DHRU External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have drafted a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated. We have presented on IDEEAL at international scientific meetings and have had media engagements, including being interviewed for a TV piece produced by RTM which will be aired later this year.
- *DHRU Sustainability:* IDEEAL and (b)(6) have decided against merging the DHRU with the Rural Medical Research Unit to form the Borneo Medical and Health Research Centre at this time. The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU.
- P&G as agreed covered all local costs for Toolkit activities May 6<sup>th</sup> and 7<sup>th</sup> including costs of flying DHRU Research Fellows to Johor.
- Exploring possibility of FPA UiTM and other universities becoming more involved in DHRU activities.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 GENDER EQUALITY AND FEMALE EMPOWERMENT

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars and trainings.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Toolkit audiences include both men and women and efforts are made to ensure gender balance in presentations (e.g. ensuring advertising to both smallholder farmers (primarily male) and their spouses, family members, child caretakers (predominantly female).

#### 3.2 PUBLIC PRIVATE PARTNERSHIP (PPP) AND GLOBAL DEVELOPMENT ALLIANCE (GDA) IMPACTS



- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM, and RSPO. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (SSHD, SWD and SFD) are engaged.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby, Sime Darby and P&G.

#### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- P&G are actively participating on project activities as are FPA UiTM. Ongoing discussions with Wilmar and Yayasan Sime Darby.
- Yayasan Sime Darby invited IDEEAL to give a project presentation as well as present toolkit sessions at YSD's environment day in Kuala Lumpur, allowing greater visibility and chance to present to a variety of public and private sector stakeholders.
- MPOC helped set-up a meeting with Minister of Plantations and Commodores that had been cancelled at the last minute. MPOC says meeting will be rescheduled in October.
- Sarawak Forestry Corporation and Sarawak State Health Department have voiced their interest in the IDEEAL work.
- Wilmar involved in toolkit information, supporting toolkit presentations on plantations and planning additional toolkit information sessions with industry partners and industry support.

#### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- As of June 25<sup>th</sup> (b)(6) of the DHRU.

#### 6. COMMUNICATIONS

- N/A

#### 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

##### 7.1 Required data gathered to run quantitative model

- Get District Level Malaria data from SSHD.
- Continue working on manuscripts describing the methods and results from the modeling activities
- In process of acquiring new disease data in peninsular Malaysia and Sarawak to update spatial model. Waiting for government approval.
- Refine modeling parameter to update spatial model and generate first maps/outputs.

- Meet with local governmental and academic institutions to create identify potential data sources and collaborations for model extension in Indonesia and Thailand.
  - Begin data acquisition for country level analysis in Thailand and Indonesia.
- 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed
- *Continue developing generalized additive model (GAM) and spatial autoregressive models (CAR/SAR) examining the association between land use change and malaria in Sabah. These two modeling approaches will allow us to determine the association between malaria and land-use change while taking in account the contribution of spatial and temporal components.*
  - Model completely translated to open source software (Python and R).
  - Updating spatial model linking Malaria incidence and land use change by implementing conditional autoregressive models.
  - Updating economic model incorporating new industry data and implementing data panel econometric modeling.
  - Further develop web app for economic optimization model.
- 6.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners
- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.
  - Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur.
  - Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and will assist with planning for First Borneo Quality of Life Conference 2018 that both (b)(6) will present.
  - Review of DHRU Masters' students' progress.
- 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates



- Toolkit outreach and modification will continue. This includes:
  - Toolkit has been piloted in rural communities, and we will continue to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
  - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
  - Working with stakeholders to conduct toolkit sessions in communities throughout Malaysia
  - Training additional community members as toolkit facilitators.
- Presenting IDEEAL project to stakeholders and potential partners in Thailand.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

EHA has prepared a proposal for the “Optimization of Land Development Based on Ecosystem Services Valuation for Kalangala, Uganda” for Wilmar and is now modifying this for Nigeria. EHA has initiated similar discussions with Sime Darby and Musim Mas.

IDEEAL attended EURT to discuss land optimization proposal with Wilmar and further discussions with RSPO and Sime Darby. Also initiated communications with Musim Mas, Olam and the Palm Oil & NGO (PONGO) Alliance

### 8.1 Target audience



**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Yaysan Sabah, Malaysian Palm Oil Board, Performance Management and Delivery Unit, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)), Ministry of Health Malaysia, Ministry of Public Health Thailand.

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Sabah State Health Department (SSHD), Ministry of Health, Department of Wildlife and national Parks Peninsular Malaysia, Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and improve land use planning through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

#### **4 - Local partners:**

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

#### **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

#### **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and bad practices in land use planning, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

#### 8.4 Milestones

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL. DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby. DCoP met Chairman of UMS Board of Directors confirming his support for DHRU. DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead. Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time. Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.' M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed. Fourth IDEEAL Stakeholder Meeting. First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU. First DHRU conference "Links between Land Change, Development and Health" held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.



September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6) Permanent Secretary Ministry of Tourism, Culture and Environment to present IDEEAL model and findings from PREDICT disease

screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) (b)(6), to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016: First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis; EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J’s sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.

July 2016: CoP signed a contract to fund 3 Masters’ students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators’ training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.

November 2016: Attended RSPO for second time

December 2016: Participated in the symposium: Linking Public Health and Ecosystem Management: a One Health Approach at the Conference of the Parties - Convention on



Biological Diversity. This symposium was highlighted by the Rio Conventions Pavilion Bulletin Vol. 200 No. 35

<http://enb.iisd.org/download/pdf/sd/enbplus200num35e.pdf>

Two of the DHRU Masters students presented their posters “Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia” and “Soil - Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah;” EHA Lab Manager presented poster “Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia” at the One Health EcoHealth conference in Melbourne. DCoP gave a talk on IDEEAL “Analyzing the health value of a tropical forest - New strategies to mitigate pandemic prevention”.

January 2017: P&G agreed to use DRU Research Fellows to present Toolkit Workshop in May, which is a KPI for DHRU becoming a Centre.

February 2017: Presented IDEEAL work to MPOB, P&G including Dr. from P&G Environmental Stewardship and Sustainability program and (b)(6) for Proforest.

Attended International Workshop on Proboscis Monkey Conservation in Sabah. Discussed IDEEAL work with CEO of Yayasan Sime Darby and raised IDEEAL again with Yayasan Sabah and Sarawak Forestry Corporation.

March 2017: First meetings in Thailand to discuss expansion of IDEEAL work with DNPWP and BoE DDC MPH.

April 2017: IDEEAL met with new (b)(6) and had a lengthy discussion about IDEEAL and PREDICT work.

May 2017: EHA Field Manager, Community Engagement Coordinator and Spatial Modeler presented toolkit to 24 smallholder oil palm farmers in Kampung Sungai Jambi, Johor, Malaysia. As part of this presentation, two trained facilitators from the DHRU presented the toolkit to the smallholders with assistance from EcoHealth Alliance staff. This is one of the deliverables for the DHRU and will assist in its establishment as a center.

Community Engagement Coordinator gave a talk “Analyzing the Health Value of a Tropical Forest – New strategies to mitigate Pandemic Potential” at Yayasan Sime Darby’s Environment Day. Presented toolkit activities to 3 teachers and 15 children.



DCoP gave a talk “Promoting One Health & Conservation through Zoonotic Disease Surveillance: The PREDICT & IDEEAL Projects in Malaysia” at the 3rd Borneo Tropical Medicine and Infectious Disease Congress 2017.

June 2017: Wilmar ask IDEEAL to prepare land optimization proposal for Nigeria which will be focus of Wilmar palm oil expansion for next 10 - 20 years. DCoP attends the first official Palm Oil & NGO (PONGO) Alliance meeting. DCoP meets with (b)(6) (b)(6) for Sime Darby to discuss land evaluation we are planning with Wilmar and might be able to help with IDEEAL data for Sabah and Peninsular Malaysia.

(b)(6) of the DHRU.

Researched and selected potential study areas for Thailand.

July 2017: Estimated country-specific ecosystem services value for areas in the current IDEEAL study region.



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Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 4 Quarter 4 – July 15, 2017 to October 14, 2017

Submission Date: November 20, 2017

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to May 31, 2018

(b)(6)

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## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 – May 31 <sup>st</sup> 2018
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	July 15, 2017 – October 14, 2017



## LIST OF ACRONYMS

AmCham	American Chamber of Commerce
BAU	Business as Usual
BoE DDC MPH	Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health
BCI	BC Initiative
BVD	Bureau of Vector Borne Disease
CoP	Chief of Party
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DNPWPC	Department of National Parks, Wildlife and Plant Conservation, Thailand
DCoP	Deputy Chief of Party
DG	Director General
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FCI	Faculty of Computing and Informatics
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GAM	Generalized Additive Model
GIDEON	Global Infectious Disease and Epidemiology Network
GSQM	Group Sustainability and Quality Management
J&J	Johnson & Johnson
KPI	Key Performance Indicators
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
MIMOS	Malaysian Institute of Microelectronic Systems
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health
MORU	Mahidol - Oxford Tropical Medicine Research Unit
MPOC	Malaysian Palm Oil Council
MPOB	Malaysian Palm Oil Board

## LIST OF ACRONYMS (CONTINUED)

MRD	Ministry of Rural Development
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NMRR	National Medical Research Register
PERHILITAN	Department of Wildlife and National Parks (Malay)
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SMR	Standardized Mortality Ratio
SSHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
ToT	Training of Trainers
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
VCS	Verified Carbon Standard
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature

## 1.1 Introduction

Under the United States Agency for International Development (USAID) Regional Development Mission for Asia (RDMA) Cooperative Agreement No. AID-486-A-13-00005, titled Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL), EcoHealth Alliance will contribute to the evidence-based knowledge of and multi-sector approach to managing infectious disease emergence and the economics of altered landscapes in the region served by USAID/RDMA.

The period of performance for the US\$500K IDEEAL extension project is December 1, 2016 - May 31, 2018.

## 1.2 Project Summary

Under a cooperative agreement with USAID/RDMA and in partnership with governmental and non-governmental stakeholders, EHA will continue the development of quantitative models relating health costs and potential savings as a function of land use change. In addition, EHA will extend the geographic scope of the project to Sabah, Sarawak, Peninsular Malaysia as well as minor activities to Kalimantan and Thailand. This extension will also support the DHRU in becoming a regionally recognized Center of Excellence, and advance outreach and engagement via our health and land use change toolkit (including adapting the toolkit for new regions). The goal is to bring the lessons learned in the first phase to a regional scale to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society;

build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and continued establish a training, learning, and resource sharing platform in Sabah, Malaysia to sustain project impacts after the project.

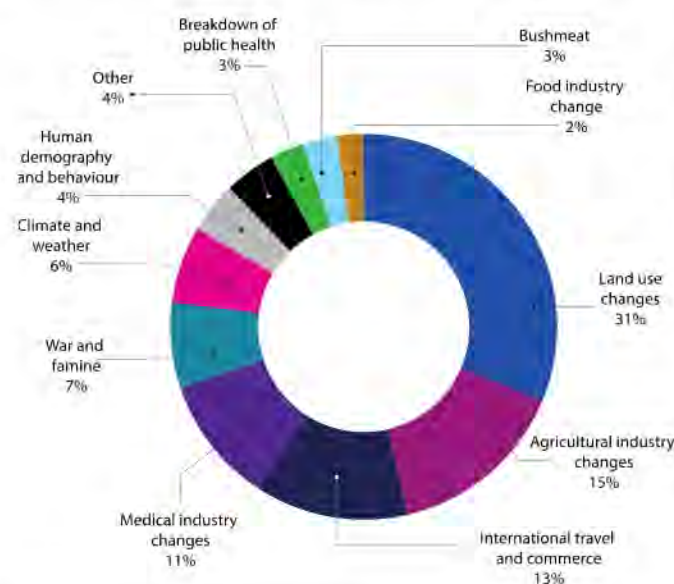


Figure 1. Primary drivers of past disease emergence. Land use change is the most important driver. Source: Loh et al. 2015<sup>1</sup>, UNEP 2016<sup>2</sup>.

<sup>1</sup> Loh, E.H., C. Zambrana-Torrel, K.J. Olival, T.L. Bogich, C.K. Johnson, J.A.K. Mazet, W. Karesh, and P. Daszak. 2015. Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control. *Vector-Borne and Zoonotic Diseases* 15:432–437.

<sup>2</sup> UNEP (2016). *UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern*. United Nations Environment Programme, Nairobi.



At the end of the project period, EHA and project partners will have produced three main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision, 2) the Center for Development and Health at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships between land use change and disease emergence and 3) scientific, gender-sensitive, health and environment communications toolkit that incorporates research and modeling results in effective outreach tools for policy makers, private companies, government organizations, and civil society stakeholders.

### 1.3 Summary of Results to Date

Indicators	Year 4			
	Baseline	Exp	Act	Ratio Rating
<b>Output indicator</b>				
Required data gathered to run the quantitative analyses				
Portfolio of quantitative analyses assessing EID spillover likelihood and damages as a function of land use change				
Develop the DHRU from a unit to a Research Centre at UMS and into a regional center of excellence for additional research, analysis, and cross-disciplinary partnerships				
Development of toolkit for communicating the health impacts of differing land use options				
Improved outreach and communication of translated and quantitative resources to policy makers and civil society advocates				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), Ongoing activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- July 19: DCoP met with (b)(6) for Sime Darby; (b)(6) all from Group Sustainability and Quality Management (GSQM). DCoP briefed SD team on PREDICT and IDEEAL work in Malaysia and presented the Sabah IDEEAL work in detail. Sime Darby agreed to provide data from their operations in Malaysia to help refine Sabah model and create model for whole of Malaysia. EHA will need to sign an NDA before any data can be shared. Finally, DCoP discussed the idea of developing a proposal to help SD optimize their land use in areas where they are expanding their operations. This is something they are very interested in pursuing and asked if the IDEEAL team can prepare an "Optimizing Land Use" Proposal for Liberia. SD will provide more details on their Liberia operations to help with this effort.

- July 21: A student review with the three DHRU students was held to get updates and define future work. (b)(6) is making good progress and should complete (b)(6) (b)(6) is on target; he will now carry out microsatellite screening on Sabah and Peninsular Malaysia populations by January 2018 before proceeding further with disease screening; (b)(6) has been asked to complete her survey preparations by September 20<sup>th</sup> when the next round of student reviews will be held.



- July 25: DCoP met with (b)(6) at RSPO, where he was briefed on PREDICT and IDEEAL work in Malaysia and presented the Sabah IDEEAL work in detail. (b)(6) thought our figure for logging revenue is too high, but did not suggest an alternative or a better source to find a more accurate figure. (b)(6) advised that EHA review and comment on the RSPO Principles and Criteria in order for land use change and disease emergence to be considered for certification. The RSPO Principles and Criteria were being reviewed for the first time since 2013, they will not be reviewed again until 2021. The Principles and Criteria are the rules that have to be followed to get RSPO Certification.
- July 27: During IDEEAL management call we decided not to lobby for a speaking slot at RSPO Bali 2017, but instead, to focus our efforts on the Principles and Criteria review and to continue to engage with the groups actively involved in Sabah's efforts for all Oil Palm to be RSPO certified by 2025, and to lobby for health and the impact of disease emergence as a result of land use change to be added as a consideration for High Conservation Value assessments in addition to continuing to engage with companies like Sime Darby and Wilmar.
- July 28: A 30 minute documentary (Part 1) about PREDICT and IDEEAL work in Sabah airs on national television. Although direct reference to IDEEAL does not make the final edit the ideas behind IDEEAL and the links between land use change and disease emergence are well explained. The documentary can be accessed here: <https://www.youtube.com/watch?v=rtWjGFn6UzU>
- August 1: "Optimizing Land Use" Proposal for Sime Darby operations in Liberia shared.
- August 4: A 30 minute documentary (Part 2) about PREDICT and IDEEAL work in Sabah airs on national television.
- August 7: DCoP met with (b)(6) at GSQM. DCoP briefed (b)(6) on IDEEAL and PREDICT and discussed possibility of conducting IDEEAL Toolkit and PREDICT training with 20 of Sime Darby Plantation Managers and Medical Assistants (who are responsible for healthcare on SD plantations) from Sarawak and Sabah. This is something we will pursue further once we have signed the NDA and SD starts to share their data.
- August 11: DCoP met with (b)(6) from the P&G Palm Sustainability Program to discuss the feedback from the IDEEAL Toolkit presentation on May 7<sup>th</sup>. P&G feel Toolkit was well received and would like IDEEAL to consider being involved in future events 1 every 4 months. This will be discussed further. UiTM are no longer working with P&G and will have no further engagement with IDEEAL. (b)(6) suggests IDEEAL meeting with MIMOS and will try and schedule a meeting for end of August. MIMOS is a government linked company focused on generating technology



solutions that enable the government to deliver better services and for Industry to achieve continued growth.

- August 21: DCoP met with (b)(6)

DCoP presented the IDEEAL model and discussed the “Optimizing Land Use” Proposal for Liberia. (b)(6) had a lot of questions about the IDEEAL work and proposal, but was supportive of our efforts and felt the IDEEAL work would be useful in dealing with the negative impacts of land use change and was a far more pragmatic approach than being focused purely on carbon stocks.

- August 29: DCoP, Senior Modeler, Economic Modeler, Community Engagement Coordinator, and Spatial Modeler met with (b)(6) to further discuss IDEEAL, data that we need for Malaysia modeling and concerns they have regarding the modeling and it possibly reflecting badly on their operations. Meeting was quite productive with a lot of input from Sime Darby into production costs and downstream use of palm oil not considered in the model. DCoP reassured them that the aim of the IDEEAL project was to work with industry not against them. A follow up meeting with (b)(6) planned for September 11<sup>th</sup>.
- August 29: SSHD share the Malaria data requested at the district level.
- August 30: DCoP met with (b)(6) at the Mahidol – Oxford Tropical Medicine Research Unit (MORU). MORU has all the Malaria data for the whole of Thailand from 2012 onwards. They have been cleaning this data set which addresses the concerns regarding different reporting systems. (b)(6) is willing to work on the IDEEAL project and share this data and suggested we meet with the new Director of the Bureau of Vector Borne Diseases.
- August 31: DCoP, Senior Modeler, Community Engagement Coordinator, Spatial Modeler, and Economic Modeler met with (b)(6) and the team from the Faculty of Forestry at KU, (b)(6) from DNPWPC to discuss in detail the land use data needed for the IDEEAL modeling in Thailand. This is a productive meeting with a plan for where to get most of the data needed for the modeling formulated. DNPWPC agreed to share their data with FFKU, as this will be easier and quicker than providing to IDEEAL. FFKU team to confirm costs and available data sets for land use maps, etc., that need to be purchased.



- September 1: DCoP, Senior Modeler, Community Engagement Coordinator, Spatial Modeler, and Economic Modeler met with (b)(6) of BoE to further discuss the data required for IDEEAL work in Thailand. (b)(6) confirms that (b)(6) is the new Director of the Bureau of Vector-borne Disease (BVD) and that it would be a good idea to meet with him on our next trip to Thailand as much of the Malaria data will need to come directly from BVD.
- September 1: DCoP, Senior Modeler, Community Engagement Coordinator, Spatial Modeler, and Economic Modeler met with (b)(6) to further discuss MORU involvement in the IDEEAL project. MORU is developing risk maps for Malaria for the Thai government and also working in Cambodia, Lao, Myanmar and Bangladesh. MORU has been working to clean the Malaria data from the MPoH and is happy to share this data with IDEEAL from 2012 onwards. MORU will also be able to provide Dengue data. (b)(6) explained that he was originally instructed that he did not need ethical approval, however, a few months into his work, he was told that ethical approval was indeed needed, he recommends that we resolve this issue ASAP.
- September 8: DCoP, Senior Modeler, and Economic Modeler met with (b)(6) from P&G and (b)(6) of Corporate Market Strategies at MIMOS Berhad. MIMOS Berhad is a research and development institution under the purview of the Malaysian Ministry of Science, Technology and Innovation. DCoP briefed (b)(6) on the IDEEAL work and the idea of developing a blue print for land use planning in Sabah. Senior Spatial Modeler and Economist provided more details on the modeling and its future direction. MIMOS is very interested in the IDEEAL work and see the idea of developing a blueprint for Sabah as a gift to the Sabah government. MIMOS suggested we collaborate with UMS and the Faculty of Computing and Informatics, which MIMOS is going to support in creating a big data hub. MIMOS sees the IDEEAL blueprint of Sabah as a perfect first project. (b)(6) will provide introductions to (b)(6) at the Faculty of Computing and Informatics (FCI). If IDEEAL can gather the data required, MIMOS, through FCI, will provide computers and other equipment and software required to generate the blueprint.
- September 11: DCoP and Economic Modeler met with (b)(6) Strategy and Innovation Department, and (b)(6) Planation Strategy and Innovation at Sime Darby to further discuss IDEEAL. During the meeting they shared data on the name and location of all palm oil estates for Sabah and Sarawak, number of hectares of palm oil, rubber, and other crops, and total number of hectares planted. Using this data we expect to estimate: the number of small, medium, and large producers in Sabah and Sarawak; the number of hectares of palm oil planted for small, medium, and large producers in Sabah and Sarawak; the total palm oil yield for Sabah and Sarawak of small, medium, and large producers; locations where small, medium, and



large producers are concentrated. The IDEEAL team will create a density map of yields and productions for small, medium, and large producers, and determine the relationship between the number of hectares cleared for agricultural expansion and new Malaria cases. This will allow us to determine the number of expected new Malaria cases after clearing a certain amount of forest area. After this analysis, we will use this new information as an input for our modeling team to improve the modeling and estimation for the IDEEAL model, and run different versions of the model comparing the impact of smallholders to medium size plantations to gold standard operations like Sime Darby.

- September 19: CoP, DCoP and (b)(6) met with DHRU Research Fellows to discuss the direction of the DHRU and activities for the coming year.
- September 20-7: IDEEAL stakeholder meeting is held at UMS. This is a very productive meeting with much discussion about the strength and weaknesses of the IDEEAL model. There are concerns about focusing only on Malaria. CoP and DCoP explain that we started with Malaria as it was the disease linked to land use change with the most available data, that we have found a link between deforestation and land use change in Sabah – in districts where forests have been fragmented you see an increase in Malaria cases until the landscape becomes uniform again. We explained that we are also planning to look into the impact of other viruses as a result of land use change. There was also a lot of discussion about the IDEEAL position paper and a general feeling that the position paper would have more impact if it was presented to cabinet by both SWD and SSHD. (b)(6) (b)(6) from FCI attended the meeting and is interested in the IDEEAL work. The participants were supportive of the idea of developing a blue print for Sabah and the first meeting to discuss this project is planned for early December.
- September 20: Met with all DHRU students to discuss their progress. (b)(6) has finished and is waiting to defend her Masters' degree; (b)(6) is on target to complete his Masters' as planned. (b)(6) is behind schedule and needs to finalize her questionnaire, maintain better contact with her supervisors and plan her field work for early 2018.
- September 19-24: IDEEAL videographer interviewed (b)(6), DCoP, and DHRU students, and captures more footage to finalize USAID IDEEAL video.
- September 22: CoP and DCoP met with (b)(6) (b)(6) at USAID RDMA to brief them on IDEEAL progress.
- September 26: DCoP met with US Ambassador to discuss PREDICT, IDEEAL and GVP.
- October 14: DCoP met with (b)(6) (b)(6) MPOC to discuss the IDEEAL work. Both were very receptive. We hope to have a follow-up meeting in early 2018.



- Modeling team focused this quarter on continuing ecosystem services valuation, refining the Malaria and land use models, and data acquisition for the expanded study region (see details in Modeling Activities below).
- Updated workplan to include Thailand as a high intensity country and have lower engagement in Sarawak. This involves a country wide preliminary dynamic optimization model using publicly available global data and a more refined model in 1-2 selected provinces in Thailand.
- Selected Surat Thani and Krabi as study areas for regional extension of model in Thailand.
- Continued conversations with Ministry of Health in Thailand and Kasetsart University Faculty of Forestry, and Department of National Parks to establish terms of data sharing and research collaboration. Agreements to be signed in the next quarter. Established liaisons with MORU for Malaria (and perhaps other tropical diseases) data sharing and possible collaboration.
- Met with operations team at Sime Darby and obtained detailed information on the production system and yield of palm oil per hectare, as well as data on costs of production. Sime Darby also agreed to share maps of plantations and their size in Sabah and Sarawak, once NDA has been signed. This will allow us to refine the economic and spatial models.
- Met with P&G about potential future collaboration on outreach and about connecting with organizations that may have statistical data for Malaysia.

#### 2.1.1 Toolkit Development

- Continued the development of the R Shiny App to create user-friendly version of model
- Planning adaptation of toolkit modules (tools) for web use.
- Discussed potential collaboration on outreach with Kasetsart University; to be further developed next quarter.

#### 2.1.2 Modeling Activities

- Estimated the country-specific ecosystem services values for carbon sequestration for Malaysia, Indonesia, and Thailand, using InVEST software. This will allow more precise estimation of ecosystem service values for each area in the study region. Mapped ecosystem services values for carbon storage and net present value in Malaysia, Indonesia, and Thailand.
- Conducted literature review to identify trends and gaps in types of ecosystem services evaluated, geographic coverage, and valuation methods.

- Began developing generalized additive model (GAM) examining the association between land use change and Malaria in Sabah. Continued work on conditional/simultaneous autoregressive models linking Malaria incidence and land use change. These two modeling approaches will allow us to determine the association between Malaria and land-use change while taking into account the contribution of spatial and temporal components.
- Initial SAR/CAR maps of estimated Malaria standardized morbidity rate per year (2000-2013) due to land use change in Sabah created. Models to be re-run refining parameters and precipitation data.
- Identified Malaria case/treatment/prevention cost, land use/protected forest, and economic (rubber authority of Thailand) databases and sources for rubber production in Thailand.

## 2.2 Implementation challenges

- Recent rabies outbreak in Sarawak complicates modeling extension efforts in this region as local government needs to prioritize. Proposed a change in current workplan for limited engagement in Sarawak.
- Website has been shared with USAID-RDMA and is awaiting final approval.
- Need to formalize data sharing agreements, MOUs, and ethical permits to access all of the necessary data for model expansion.

## 2.3 M&E Update

- *DHRU External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have drafted a webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated. We have presented on IDEEAL at international scientific meetings and have had media engagements. TV piece produced by RTM, which included IDEEAL staff aired this quarter. [b](6) was interviewed for an upcoming video on IDEEAL being produced by the project team.
- *DHRU Sustainability:* The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU. DHRU graduate students are making progress with their research. At the IDEEAL stakeholder meeting, a blueprint for land use planning that UMS would lead was discussed; the first meeting is planned for next quarter.
- *Scientific Communication:* Development of the interactive modeling app is in progress, which will provide clear and tangible communication of the IDEEAL project modeling

results, along with background information on health and land use change. We expect a beta-version to be ready to share with stakeholders in Q2 of next year.

### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars and trainings.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Toolkit audiences include both men and women and efforts are made to ensure gender balance in presentations (e.g. ensuring advertising to both smallholder farmers (primarily male) and their spouses, family members, child caretakers (predominantly female)).

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (SSHD, SWD and SFD) are engaged.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby, Sime Darby and P&G.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- P&G are actively participating on project activities. Ongoing discussions with Wilmar and Sime Darby.
- MPOC helped set-up a meeting with Minister of Plantations and Commodities that had been cancelled at the last minute. Meeting was been rescheduled to October 14<sup>th</sup>.
- Wilmar involved in toolkit information, supporting toolkit presentations on plantations and planning additional toolkit information sessions with industry partners and industry support.
- Sime Darby has expressed interest in economic and spatial models. Team agreed to generate regional models for Sabah to showcase utility and discuss possible application in future African operations.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- None to report.



## 6. COMMUNICATIONS

- N/A

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### 7.1 Required data gathered to run quantitative model

- Continue working on manuscripts describing the methods and results from the modeling activities
- In process of acquiring new disease data in peninsular Malaysia and Sarawak to update spatial model. Waiting for government approval.
- Meetings with local governmental and academic institutions to create identify potential data sources and collaborations for model extension in Indonesia and Thailand.
- Explore disease and extractive industry data availability and quality for Surat Thani and Krabi. Begin data acquisition.
- File for ethical approval to work with healthcare data in Thailand and Malaysia. This process should take about 3 months.

### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Refine Malaria SAR/CAR models.
- Began developing GAM model examining the association between land use change and malaria for Sabah.
- Update economic model incorporating new industry data.
- Further develop of web application (Shiny) for economic optimization model.

### 6.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Will continue to develop a written constitution and governance plan for the DHRU with UMS faculty.
- Will meet with UMS administration to discuss transforming the Unit into a Center and milestones needed for this to occur.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and will assist with planning for First Borneo Quality of Life Conference 2018 that both (b)(6) (b)(6) will present. DCoP will present on IDEEAL work.
- Review of DHRU Masters' students' progress.

#### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Toolkit outreach and modification will continue. This includes:
  - Continuing to refine training and deployment of toolkits to stakeholders, including the possibility of creating video content for toolkit communication to make toolkits more accessible via online resources for corporations who wish to utilize toolkits.
  - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.
  - Working with stakeholders to conduct toolkit sessions in communities throughout Malaysia
  - Training additional community members as toolkit facilitators.

### 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

EHA continues work and membership with industry contacts, government, industry, and NGO stakeholders in RSPO. RSPO industry stakeholders attending the IDEEAL Stakeholder meeting in September 2017.

#### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Yaysan Sabah, Malaysian Palm Oil Board, Performance Management and Delivery Unit, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)), Ministry of Health Malaysia, Ministry of Public Health Thailand.

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Sabah State Health Department (SSHD), Ministry of Health, Department of Wildlife and national Parks Peninsular Malaysia, Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.

**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and improve land use planning through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

### 4 - Local partners:

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*



## **5 - Direct beneficiaries:**

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## **6 - General public:**

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and bad practices in land use planning, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

## **8.4 Milestones**

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time. (b)(6)

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference "Links between Land Change, Development and Health" held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.



October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people. Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.



April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce “Emerging and Zoonotic Disease Colloquium” in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:

First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J’s sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.

July 2016: CoP signed a contract to fund 3 Masters’ students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators’ training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.

November 2016: Attended RSPO for second time

December 2016: Participated in the symposium: Linking Public Health and Ecosystem Management: a One Health Approach at the Conference of the Parties - Convention on Biological Diversity. This symposium was highlighted by the Rio Conventions Pavilion Bulletin Vol. 200 No. 35

<http://enb.iisd.org/download/pdf/sd/enbplus200num35e.pdf>

Two of the DHRU Masters students presented their posters “Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia” and “Soil - Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah;” EHA Lab Manager presented poster “Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia” at the One Health EcoHealth conference in

Melbourne. DCoP gave a talk on IDEEAL “Analyzing the health value of a tropical forest - New strategies to mitigate pandemic prevention”.

January 2017: P&G agreed to use DRU Research Fellows to present Toolkit Workshop in May, which is a KPI for DHRU becoming a Centre.

February 2017: Presented IDEEAL work to MPOB, P&G including (b)(6) from P&G Environmental Stewardship and Sustainability program and (b)(6) for Proforest.

Attended International Workshop on Proboscis Monkey Conservation in Sabah. Discussed IDEEAL work with CEO of Yayasan Sime Darby and raised IDEEAL again with Yayasan Sabah and Sarawak Forestry Corporation.

March 2017: First meetings in Thailand to discuss expansion of IDEEAL work with DNPWPC and BoE DDC MPH.

April 2017: IDEEAL met with new (b)(6) and had a lengthy discussion about IDEEAL and PREDICT work.

May 2017: EHA Field Manager, Community Engagement Coordinator and Spatial Modeler presented toolkit to 24 smallholder oil palm farmers in Kampung Sungai Jambi, Johor, Malaysia. As part of this presentation, two trained facilitators from the DHRU presented the toolkit to the smallholders with assistance from EcoHealth Alliance staff. This is one of the deliverables for the DHRU and will assist in its establishment as a center.

Community Engagement Coordinator gave a talk “Analyzing the Health Value of a Tropical Forest – New strategies to mitigate Pandemic Potential” at Yayasan Sime Darby’s Environment Day. Presented toolkit activities to 3 teachers and 15 children. DCoP gave a talk “Promoting One Health & Conservation through Zoonotic Disease Surveillance: The PREDICT & IDEEAL Projects in Malaysia” at the 3rd Borneo Tropical Medicine and Infectious Disease Congress 2017.

June 2017: Wilmar ask IDEEAL to prepare land optimization proposal for Nigeria which will be focus of Wilmar palm oil expansion for next 10 - 20 years. DCoP attends the first official Palm Oil & NGO (PONGO) Alliance meeting. DCoP meets with (b)(6) Group Chief Sustainability Officer for Sime Darby to discuss land evaluation we are planning with Wilmar and might be able to help with IDEEAL data for Sabah and Peninsular Malaysia.

(b)(6) confirmed as the official Head of the DHRU.

Researched and selected potential study areas for Thailand.

July 2017: Estimated country-specific ecosystem services value for areas in the current IDEEAL study region.

August 2017: Meetings in Kuala Lumpur with Sime Darby to obtain detailed cost and oil palm production data for Sabah. Meeting with P&G about potential sources of data acquisition.

September 2017: Meetings in Thailand with Ministry of Health, Kasetsart University Faculty of Forestry, Department of National Parks, and MORU on potential data sources and possible areas for collaboration on research projects.

IDEEAL team met with (b)(6) in New York to discuss future steps for modeling and publications on IDEEAL project. A road map was outlined on how to apply the IDEEAL modeling on a global scale.





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FROM THE AMERICAN PEOPLE

Infectious Disease Emergence and Economics of Altered Landscapes

# Quarterly Report

Year 5 Quarter 1 – October 15, 2017 to January 14, 2018

Submission Date: March 20, 2018

[Contract/Agreement] Number: AID-486-A-13-00005

Activity Start Date and End Date: October 15, 2013 to May 31, 2018

(b)(6)

Submitted by: Peter Daszak, Chief of Party

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This document was produced for review by the United States Agency for International Development Regional Development Mission for Asia (USAID/RDMA).

## 1. PROGRAM OVERVIEW/SUMMARY

<b>Program Name:</b>	Infectious Disease Emergence and the Economics of Altered Landscapes (IDEEAL)
<b>Activity Start Date And End Date:</b>	October 15 <sup>th</sup> 2013 – May 31 <sup>st</sup> 2018
<b>Name of Prime Implementing Partner:</b>	EcoHealth Alliance
<b>[Contract/Agreement] Number:</b>	AID-486-A-13-00005
<b>Major Counterpart Organizations</b>	Universiti Malaysia Sabah, Sabah Wildlife Department, Department of State Health Sabah, Sabah Forestry Department
<b>Geographic Coverage (cities and or countries)</b>	Sabah, Malaysia
<b>Reporting Period:</b>	October 15, 2017 – January 14, 2018

## LIST OF ACRONYMS

AmCham	American Chamber of Commerce
BAU	Business as Usual
BoE DDC MPH	Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health
BCI	BC Initiative
BCT	Borneo Conservation Trust
BMHRC	Borneo Medical and Health Research Centre
BVD	Bureau of Vector Borne Disease
CoP	Chief of Party
DHRU	Development and Health Research Unit
DF	DEEP FOREST Project
DFHC	DEEP FOREST Human Contact
DGFC	Danau Girang Field Centre
DTA	Data Transfer Agreement
DVS	Department of Veterinary Services
DWNP	Department of Wildlife and National Parks Peninsular Malaysia
DNPWPC	Department of National Parks, Wildlife and Plant Conservation, Thailand
DCoP	Deputy Chief of Party
DG	Director General
EHA	EcoHealth Alliance
EID	Emerging Infectious Disease
EM	Economic Modeler
EPT	Emerging Pandemic Threats
FAO	Food and Agriculture Organization
FBE UMS	Faculty of Business and Economics, Universiti Malaysia Sabah
FCI	Faculty of Computing and Informatics
FMHS UMS	Faculty of Medical and Health Sciences, Universiti Malaysia Sabah
FRIM	Forest Research Institute Malaysia
GAM	Generalized Additive Model
GIDEON	Global Infectious Disease and Epidemiology Network
GSQM	Group Sustainability and Quality Management
J&J	Johnson & Johnson
KPI	Key Performance Indicators
LEAF	Lowering Emissions in Asia's Forests
LEAP	Land Empowerment Animals People
LiLA	Living Landscape Alliance
MAFI	Ministry of Agriculture and Food Industry
MIMOS	Malaysian Institute of Microelectronic Systems
M&E	Monitoring and Evaluation
MOA	Memorandum of Agreement
MoH	Ministry of Health



## LIST OF ACRONYMS (CONTINUED)

MORU	Mahidol - Oxford Tropical Medicine Research Unit
MPOC	Malaysian Palm Oil Council
MPOB	Malaysian Palm Oil Board
MRD	Ministry of Rural Development
MyOHUN	Malaysia One Health University Network
NASA	National Aeronautics and Space Administration
NGO	Non-Governmental Organization
NMRR	National Medical Research Register
PERHILITAN	Department of Wildlife and National Parks (Malay)
RDMA	Regional Development Mission for Asia
RFA	Request for Applications
RSPO	Roundtable on Sustainable Palm Oil
SDC	Sabah Development Corridor
SEDIA	Sabah Economic and Development and Investment Authority
SFD	Sabah Forestry Department
SLSD	Sabah Land and Survey Department
SM	Senior Modeler
SMR	Standardized Mortality Ratio
SSHD	Sabah State Health Department
SWD	Sabah Wildlife Department
SPA	Senior Policy Advisor
TEEB	The Economics of Ecosystems and Biodiversity
ToT	Training of Trainers
UMS	Universiti Malaysia Sabah
USAID	United States Agency for International Development
USGS	United States Geological Survey
VCS	Verified Carbon Standard
TEV	Total Ecosystem Value
WHO	World Health Organization
WRU	Wildlife Rescue Unit
WWF	World Wide Fund for Nature

## 1.1 Introduction

Under the United States Agency for International Development (USAID) Regional Development Mission for Asia (RDMA) Cooperative Agreement No. AID-486-A-13-00005, titled Infectious Disease Emergence and Economics of Altered Landscapes (IDEEAL), EcoHealth Alliance will contribute to the evidence-based knowledge of and multi-sector approach to managing infectious disease emergence and the economics of altered landscapes in the region served by USAID/RDMA.

The period of performance for the US\$500K IDEEAL extension project is December 1, 2016 - May 31, 2018.

## 1.2 Project Summary

Under a cooperative agreement with USAID/RDMA and in partnership with governmental and non-governmental stakeholders, EHA will continue the development of quantitative models relating health costs and potential savings as a function of land use change. In addition, EHA will extend the geographic scope of the project to Sabah, Sarawak, Peninsular Malaysia as well as minor activities to Kalimantan and Thailand. This extension will also support the DHRU in becoming a regionally recognized Center of Excellence, and advance outreach and engagement via our health and land use change toolkit (including adapting the toolkit for new regions). The goal is to bring the lessons learned in the first phase to a regional scale to help promote reduced-impact land utilization by governments, private sector stakeholders and civil society;

build alliances amongst a diverse range of stakeholders; integrate cross-disciplinary approaches in gathering, analyzing and disseminating information; and continued establish a training, learning, and resource sharing platform in Sabah, Malaysia to sustain project impacts after the project.

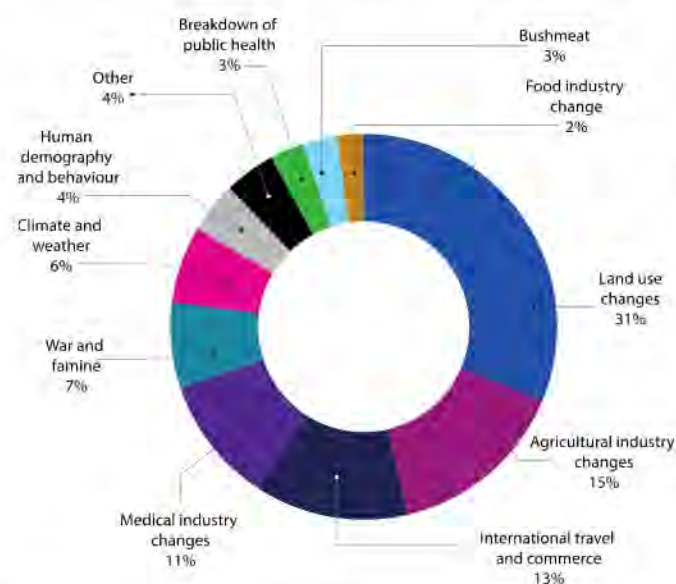


Figure 1. Primary drivers of past disease emergence. Land use change is the most important driver. Source: Loh et al. 2015<sup>1</sup>, UNEP 2016<sup>2</sup>.

<sup>1</sup> Loh, E.H., C. Zambrana-Torrel, K.J. Olival, T.L. Bogich, C.K. Johnson, J.A.K. Mazet, W. Karesh, and P. Daszak. 2015. Targeting Transmission Pathways for Emerging Zoonotic Disease Surveillance and Control. *Vector-Borne and Zoonotic Diseases* 15:432–437.

<sup>2</sup> UNEP (2016). UNEP Frontiers 2016 Report: Emerging Issues of Environmental Concern. United Nations Environment Programme, Nairobi.

At the end of the project period, EHA and project partners will have produced three main deliverables that satisfy the proposed IRs and sub-IRs. They are: 1) quantitative models of land use change and disease emergence (risk maps, economic impacts and health impacts) to use in local and regional decision, 2) the Center for Development and Health at UMS to serve as a permanent center of excellence and platform for continued research and training, stakeholder engagement, and as a regional and national source of information on the economic relationships between land use change and disease emergence and 3) scientific, gender-sensitive, health and environment communications toolkit that incorporates research and modeling results in effective outreach tools for policy makers, private companies, government organizations, and civil society stakeholders.



### 1.3 Summary of Results to Date

Indicators	Year 4			
	Baseline	Exp	Act	Ratio Rating
<b>Output indicator</b>				
Required data gathered to run the quantitative analyses				
Portfolio of quantitative analyses assessing EID spillover likelihood and damages as a function of land use change				
Develop the DHRU from a unit to a Research Centre at UMS and into a regional center of excellence for additional research, analysis, and cross-disciplinary partnerships				
Development of toolkit for communicating the health impacts of differing land use options				
Improved outreach and communication of translated and quantitative resources to policy makers and civil society advocates				

Note 1. Exp = expected; Act = actual

Note 2. Percentages are calculated based on the following stages: Planning (25%), early implementation (50%), Ongoing activities (75%) and Full implementation/completed (100%).

## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Narrative

- November 2: DCoP met with (b)(6) of DTRA CBEP, Malaysia, (b)(6) from the US Embassy. Mr. Schaefer is very interested in IDEEAL work and reiterates that DTRA might be interested in supporting some aspects of our work. A meeting is planned with DTRA to discuss further at PMAC in Feb. 2018.
- November 3: DCoP met with (b)(6) from HUTAN to discuss the meeting for developing a Blueprint for Land Use Planning for Sabah. (b)(6) has been trying to develop something along these lines for some time and is very supportive of this initiative.
- November 3: DCoP met with Deputy Director SWD to discuss Cabinet position paper. SWD asked that we simplify some of the language and add details of the cost of implementing the use of land use planning tools based on scientific evidence for more sustainable land management. The Deputy Director will discuss with the Director of SWD the Position Paper being presented to cabinet jointly by SWD and SSHD.
- November 3: DCoP met with (b)(6) FCI, to discuss plans for the meeting for developing a Blueprint for Land Use Planning for Sabah.
- November 3: DCoP met with Head of DHRU to discuss DHRU finances. Previous Head of DHRU has made it difficult to access the information needed, but progress is being made. Discussed plan for the next DHRU capacity building event – a 2-day GIS



workshop to be held for 30 participants (UMS staff and students) in December at FMHS. Further discussed Borneo Quality of Life Conference and DHRU/EHA involvement.

DHRU (b)(6) will give plenary lectures, DCoP will discuss IDEEAL, and DHRU Masters' student will present research on pangolins.

- November 6: Call for abstracts/outlines for special EcoHealth issue on Development and Health proposed for the second half of 2018. Call was circulated to stakeholders and submissions were due at the end of November. The original intent was to profile presentations from the May 2015 DHRU symposium on Land-use Change and Emerging Diseases, but topics from the up-coming Borneo Quality of Life conference, and any other relevant topics will now be welcome. Submissions will be jointly coordinated by DHRU Student Supervisor and DHRU Head.
- November 7: DCoP met with (b)(6) (b)(6) from the US Embassy. During meeting, IDEEAL progress in Malaysia and expansion to Thailand and Indonesia was discussed, as well as, potential for DTRA to support IDEEAL.
- November 21: DCoP presented talk "Promoting One Health & Conservation through Zoonotic Disease Surveillance: The PREDICT, DTRA & IDEEAL Projects in Malaysia" at PERHILITAN's 8<sup>th</sup> Seminar on Biodiversity.
- November 22: DCoP shared draft Data Transfer Agreement with (b)(6) at MORU to cover the Malaria and Dengue data that he has been given by the Bureau of Vector Borne Diseases and has spent last year cleaning.
- November 23: DCoP met with DHRU Head. Reviewed finance details provided by former DHRU Head and finalized details needed for report. Reviewed participant list for Dec 6<sup>th</sup> Blueprint meeting and finalized plans for GIS workshop.
- November 23: DCoP met with Deputy Director of SWD to further discuss Position Paper. SWD agreed that Position Paper can be submitted to Sabah Cabinet jointly by SWD and SSHD. In addition to providing details on implementation costs, the Director of SWD has requested paper to be simplified further, so it can be easily understood by the Cabinet. It is agreed that we should not rush to present to the Cabinet but wait until after the General Election expected at the end of March 2018, as it will be a different cabinet after the election.
- November 27: After reviewing the DTA and following further discussion between (b)(6) and DCoP, MORU requests an MOU for the collaboration. A draft MOU is provided for MORU to review. The DTA will also have to go through the MORU Data Access Committee.
- November 29: DCoP, Community Engagement Coordinator and Spatial Modeler met with FFKU to discuss Thailand land use data, further collaboration, potential capacity building/training activities and set a timeline for data sharing: shapefiles, population and socioeconomic data should be ready by first week of January; ecosystem data by end of January; revenue from ecotourism, cost of production, oil palm and rubber yield data by



third week of February; and land use data from Land Development Department by end of February. Upon signing of MOU, we will then review translated data and hold a training event at FFKU in Y5Q2. In Y5Q3 we will hold a meeting with all stakeholders to review project and discuss plans for next phase, if funding is available. (b)(6) notified that the MOU with the University has been approved. Activity plan outlining project roles and responsibilities will be prepared by EHA and approved by Dean of FFKU.

- November 29: DCoP and Community Engagement Coordinator met with USAID RDMA to discuss IDEEAL project progress. RDMA suggested that we should consider holding an international meeting at DHRU bringing current stakeholders from Thailand, Indonesia, and Malaysia together, but also inviting other researchers and potential stakeholders from the region to share findings and discuss ways of keeping the IDEEAL effort moving forward. Discussed the IDEEAL USAID video and timeframe for completion – RDMA would like to use video during PMAC. RDMA requested incorporation other EID costs into the modeling and App. Discussed the upcoming project closeout.
- November 30: DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6) to further discuss collaboration, capacity building activities and data transfer timeline with MORU. (b)(6) had not yet had an opportunity to review the MOU. Once approved by MoPH, (b)(6) will share the form for the MORU Data Access Committee; approval will take 1 month. The list of data needed is agreed upon, and (b)(6) confirmed data can be shared with IDEEAL team, if approved by the Director of the Department of Disease Control, while the ethical review is in process. This would be spatially explicit aggregated data for Thailand.
- November 30: DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6) of BVD and (b)(6) from the Malaria group at BVD. DCoP introduced the project and the stakeholders who will be involved in Thailand, and the data that we will be needed. (b)(6) is happy for us to have MORU's cleaned data, but it will come from the BVD directly not MORU. (b)(6) explained that this will also simplify the ethical approval process which will take around 3 months. (b)(6) is not prepared to provide a letter allowing (b)(6) to share the data with us while we wait for ethical approval. (b)(6) requested that we prepare a letter detailing the aims of the IDEEAL project in Thailand, how Thailand will benefit from this initiative for the Director General of the Department of Disease Control. We also discussed capacity building opportunities such as risk assessment and modeling workshops, and the possibility of MoPH staff joining training at FFKU.
- December 1: DCoP, Community Engagement Coordinator and Spatial Modeler met with (b)(6) also from BoE. They recommended adding reference to BoE involvement in the letter to ensure collaboration with all the bureaus within the department as well as the Bureau of Emerging Infectious Diseases, so that a concept note can be presented by (b)(6) at the OneHealth unit meeting for their approval.
- December 4: DCoP, Head of DHRU and DHRU Student Supervisor met with (b)(6). Progress is being made, but (b)(6) has withdrawn as her supervisor. Head of DHRU to confirm if UMS requires him

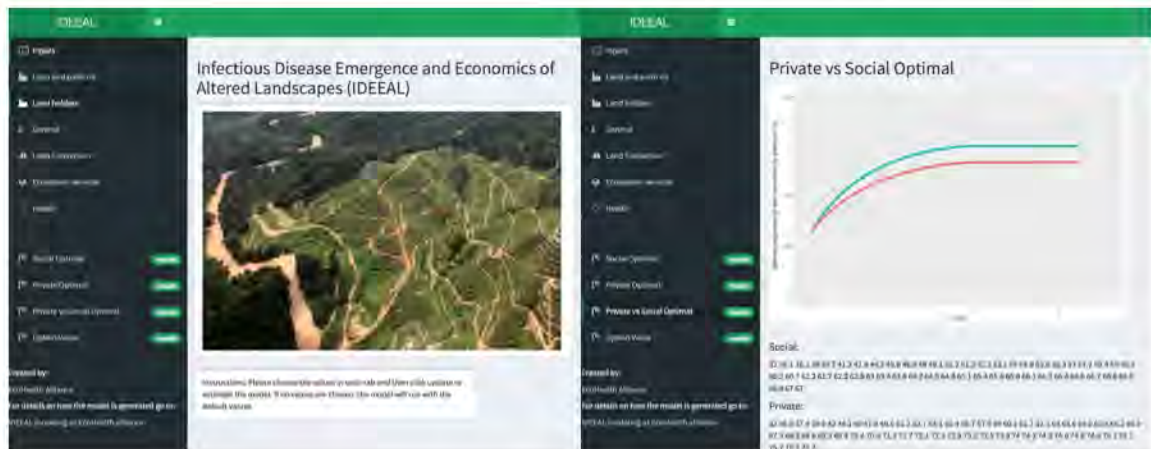


to be replaced. (b)(6) will submit her questionnaire for ethical review at UMS in early 2018. Head of DHRU to put her in touch with a statistician from FMHS to help review questionnaire and study design. Head of DHRU to write to District Officers in the areas (b)(6) will be working to assist with her entry in to those communities.

- December 4-5: Spatial Modeler and Community Engagement Coordinator led an Introduction to Geographic Information Systems (GIS) and Mapping workshop at UMS, organized by the DHRU. The course covered the following: 1) Introduction to GIS: What is GIS?, Data types (vector, raster) and their file formats, spatial resolution, coordinate reference systems (projections), applications, spatial data sources, online GIS resources. 2) Vectors: loading files (points, polylines, polygons), vector attributes, vector data in layers, editing vector data, symbology, scales. What can we do with vector data?; choropleth maps. 3) Vector functions: clipping, buffering, selecting by attribute. 4) Mapping: best practices, scale, legend, coordinate reference system, titles, color schemes, creating maps, exporting data. The training was attended by 27 participants; UMS students and faculty, and EHA staff. Workshop was well received by UMS and they expressed interest in a more advanced GIS course in 2018.
- December 6: Blueprint for Land Use Planning Sabah: Following multiple discussions over last 3 years and agreement at the last stakeholder meeting, the DHRU at UMS hosted the first Blueprint for Land Use Planning in Sabah meeting. The meeting was attended by 20 participants from PACOS, DGFC, Sime Darby, Wilmar, BCT, WWF, UMS and EHA to create a plan for sharing Sabah data that would have an impact on land use planning. The plan is to create a list of all available data, which can then be shared in a database and used to develop a blueprint for the state and create comprehensive recommendations for land use planning.
- December 13: DHRU website finalized with input from all partners and is now live at this link: <http://www.ums.edu.my/dhru/en>.
- December 16: Letter shared with the Department of Disease Control within the Ministry of Public Health Thailand, detailing the aims of the IDEEAL project in Thailand, how Thailand will benefit from this initiative and the roles of EcoHealth Alliance, the Department of Disease Control (Bureau of Vector Borne Diseases (BVD) and Bureau of Epidemiology (BoE)), and the Bureau of Emerging Infectious Diseases (BEID) as the Thai One Health Coordinating Center.
- December 16: EHA submitted an activity plan outlining project roles and responsibilities, to be approved by Dean of FFKU.
- January 14: (b)(6) reviewed MOU and was pleased. The letter is currently being reviewed by MORU Director. (b)(6) shared ethical approval form and agreed to have it translated to Thai.
- IDEEAL team is in the process of updating the planned USAID IDEEAL video. It is expected to be completed at the start of next quarter.

### 2.1.1 Toolkit Development

- Continued the development of the R Shiny App, displayed below, to create user-friendly version of model. The App now allows to choose: prices of palm oil and kernel oil, yield of palm oil and kernel oil per hectare, land conversion costs per hectare, 17 ecosystem service values (see TEEB: <http://www.teebweb.org/>), costs on prevention and control of disease, number of infections in the region, and proportion of large landholders, small landholders, and government plantations. This is a beta version, not ready to be shared.



- Planning adaptation of toolkit modules (tools) for web use. Additional toolkit development on hold until modelling results and outputs are finalized.

### 2.1.2 Modeling Activities

- Modeling team focused this quarter on continuing ecosystem services valuation, refining the Malaria and land use models, and data acquisition for the expanded study region (see details in Modeling Activities below).
- Modeling team worked on globalizing the Malaria data and exploring alternate data sources for infectious disease data in Thailand, due to the lengthy ethical approval process. The IDEAL team will still be able to generate the model for Surat Thani and Krabi even if we are still waiting for the Malaria data from MoPH.
- Modeling team collected data on international prices of crops, global crops maps, prices of livestock, and global livestock maps to create a global map of opportunity cost of land use change.
- Began preliminary work on relationship between palm oil and Malaria by size of plantations. Sime Darby provided a paper list with all landholders in Sabah and Sarawak with size and type of plantation. We are in the process of digitalizing data to create a map of landholders by size. This will require a lot of person-hours, therefore, will request assistance from Sime Darby with this effort.



- Palm oil price projections were estimated for the next 30 years using Brownian motion. Given the uncertainty in future palm oil prices and ecosystem services, we estimated real option values of waiting and not converting land into palm oil plantation.

## 2.2 Implementation challenges

- Need to formalize data sharing agreements, MOUs, and ethical permits to access all of the necessary data for model expansion. Ethical approval in Thailand is expected to take ~3 months. Modeling team is exploring additional avenues for using health data at a coarser scale.
- Due to volcanic activity on Bali during RSPO and resulting airport closures, some planned meetings with industry partners in early December had to be postponed, as they were delayed in returning from RSPO.
- Presentation of the Position Paper to the Cabinet has been delayed in anticipation of the upcoming elections in March, after which it will be presented jointly by SWD and SSHD.

## 2.3 M&E Update

- *DHRU External Communication:* We have met many of the indicators listed in this section: We have a written Communications Plan for the DHRU and have finished the webpage for the DHRU that will be co-hosted by EHA and UMS, with relevant content that will be regularly updated. We have presented on IDEEAL at international scientific meetings and have had media engagements. IDEEAL team is in the process of updating the planned USAID IDEEAL video. It is expected to be completed at the start of next quarter.
- *DHRU Sustainability:* The DHRU is currently positioned to develop into a broader information-sharing and research platform. We will continue to hold meetings to present research findings to land managers and to the public; supervise students (beyond the end of IDEEAL) and identify collaborative projects and grant opportunities with faculty from the DHRU. DHRU graduate students are making progress with their research. At the IDEEAL stakeholder meeting, a blueprint for land use planning that UMS would lead was discussed; the first meeting was held this quarter.
- *Scientific Communication:* Development of the interactive modeling app is in progress, which will provide clear and tangible communication of the IDEEAL project modeling results, along with background information on health and land use change. We expect a beta-version to be ready to share with stakeholders in Q2 of next year.



### 3. INTEGRATION OF CROSSCUTTING ISSUES AND USAID FORWARD PRIORITIES

#### 3.1 Gender Equality and Female Empowerment

- There has been a balanced ratio of female and male participants in stakeholder meetings and the first DHRU conference and subsequent seminars and trainings.
- Equal female/male participation planned for future stakeholder meetings.
- We have two female and one male student for Masters' degrees through the DHRU.
- A balance of male and female faculty are involved in DHRU.
- Toolkit audiences include both men and women and efforts are made to ensure gender balance in presentations (e.g. ensuring advertising to both smallholder farmers (primarily male) and their spouses, family members, child caretakers (predominantly female)).

#### 3.2 Public Private Partnership (PPP) and Global Development Alliance (GDA) Impacts

- DCoP continues to work toward engaging industry players through MPOC, RSPO, US Embassy, AMCHAM. CoP is working to foster interest from companies linked to EHA Board that have interest in palm oil.
- SEDIA and other Sabah State government agencies (SSHD, SWD and SFD) are engaged.
- DCoP continuing to develop relationship with Wilmar, Yayasan Sime Darby, Sime Darby and P&G.

### 4. STAKEHOLDER PARTICIPATION AND INVOLVEMENT

- P&G have been actively participating on project activities. Ongoing discussions with Wilmar and Sime Darby.
- DCoP met with (b)(6) and (b)(6) to discuss the IDEEAL work at end of last quarter. We hope to have a follow-up meeting in early 2018.
- Sime Darby has expressed interest in economic and spatial models. Team agreed to generate regional models for Sabah to showcase utility and discuss possible application in future African operations.

### 5. MANAGEMENT AND ADMINISTRATIVE ISSUES

- Contrary to the discussions that occurred at the start of engagement in Thailand, we are in need of ethical approval for Malaria data. As this information was not disclosed in primary discussions, it has affected the project timeline. We plan to use publically available Malaria data to allow our teams to generate the Thailand model while we wait for ethical approval.

- Our initial engagement with the Bureau of Epidemiology was not the best place to begin discussions, as most of the data needed will come from the Bureau of Vector Borne Diseases. This misstep has delayed the process, but it is now moving forward.

## 6. COMMUNICATIONS

- N/A

## 7. PLANNED ACTIVITIES FOR NEXT QUARTER INCLUDING UPCOMING EVENTS

### 7.1 Required data gathered to run quantitative model

- Continue working on manuscripts describing the methods and results from the modeling activities
- Continue to engage with Thailand partners to finalize agreements and start to analyze data.
- File for ethical approval to work with healthcare data in Thailand. This process should take about 3 months.

### 7.2 Portfolio of quantitative algorithms assessing EID spillover likelihood and cost as a function of land use developed

- Refine Malaria SAR/CAR models.
- Continue developing GAM model examining the association between land use change and malaria for Sabah.
- Finish development of Shiny web application based on economic optimization model.

### 7.3 Establishment of a Center for Excellence for additional research, analysis, and cross-disciplinary partners

- Certain members of Faculty at FMHS are keen for the DHRU to become part of the Borneo Medical and Health Research Centre (BMHRC). DCoP and Head of DHRU have concerns about this as the DHRU is just starting to make a name for itself and the management is working well. They are concerned that DHRU will get lost in the BMHRC and that control is lost. This will be discussed further in the next quarter.
- Research Fellows from DHRU will continue to develop planning for seminars and training that includes participants from developing countries and will assist with planning for First Borneo Quality of Life Conference 2018 that both (b)(6) will give plenary lectures, DCoP will be present talk on IDEEAL, and DHRU Masters' student will discuss research on pangolins.

### 7.4 Improved outreach and communication of translated, quantitative resources to policy makers and civil society advocates

- Toolkit outreach and modification will continue. This includes:
  - Adaptation and incorporation of model output and results into scientific outreach and communications toolkit.
  - Networking with policy makers and industry representatives to encourage use of toolkits in policy-level and private sector development decisions.
  - Working with stakeholders to enhance gender-sensitivity of toolkit and ensure equal outreach to men and women.

## 8. COMMUNICATIONS AND OUTREACH STRATEGY

EHA has implemented a communications strategy, which has included in-person meetings with local partners and stakeholders via the DHRU at UMS and teleconferences with RDMA and UMS. Written quarterly reports and annual reports have been used to communicate progress to RDMA. Public outreach has included webpage content, presentations at scientific and professional meetings, and opportunistic public outreach through news media.

EHA continues work and membership with industry contacts, government, industry, and NGO stakeholders in RSPO. RSPO industry stakeholders attending the IDEEAL Stakeholder meeting in September 2017.

### 8.1 Target audience

**U.S. government officials:** U.S. Embassies in Thailand, Malaysia and Indonesia, USAID – RDMA, USAID employees in the USA (including those in the Global Climate Change, GCC, group, global health, and desk officers for Asian countries).

**Ministries and institutional decision-makers:** Sabah Economic and Development and Investment Authority (SEDIA), Sabah Economic Ministry of Agriculture Development and Food Industry, Ministry of Tourism, Culture and Environment, Ministry of Rural and Entrepreneurial Development, Sabah Forestry Department, Malaysian Palm Oil Council, Yaysan Sabah, Malaysian Palm Oil Board, Performance Management and Delivery Unit, International Finance Corporation (IFC) (guidelines on health impact assessments (HIA)), Ministry of Health Malaysia, Ministry of Public Health Thailand.

**Private partners and industry stakeholders:** Private sector Environment, Health and Safety (EHS) Officers, industry Risk Officers, Corporate staff locally in the region, and at corporate headquarters in the USA, Europe, and regionally in SE Asia; Corporate Social Responsibility (CSR) officers.

**Local partners:** Sabah Wildlife Department (SWD), Sabah State Health Department (SSHD), Ministry of Health, Department of Wildlife and national Parks Peninsular Malaysia, Universiti of Malaysia Sabah (UMS), HUTAN, LEAF Asia, other stakeholders to be identified.

**Direct beneficiaries:** Women, worker populations, health workers, civil society advocates.



**General public:** Media in Sabah, Malaysia, regionally and globally; environmentalists and other concerned citizens via social media.

## 8.2 Messages

### 1 - US Government officials:

*This project aims to support USAID's mission to combat disease emergence and improve land use planning through economic incentives, local conservation and public-private partnerships.*

### 2 - Ministries and institutional decision-makers:

*This project aims to help you plan and manage an environment that is healthy, sustainable, and economically competitive. It will provide a foundation for future programs and policies focused on integrated and sustainable development.*

### 3 - Private partners and industry stakeholders:

*This project will provide you with information on how significant or not the economic costs of health-related hazards are to your operations, your staff, and your profitability (bottom line).*

*This project will provide you step-by-step instructions to prevent emerging infectious disease hazards in your facilities and the surrounding environment that could negatively impact your operations.*

*This project will provide you methods to keep your staff, facilities and environment healthy, while ensuring the financial, social and economic sustainability of your operations.*

*This project will provide your companies a blueprint for corporate sustainability and social responsibility in Sabah, regionally in Southeast Asia, and throughout the world.*

### 4 - Local partners:

*This project will give you the scientific and economic evidence and tools you need to promote healthy and environmentally sustainable land-use practices in Sabah.*

### 5 - Direct beneficiaries:

*This project aims to improve the lives of men and women by giving them the knowledge and skills they need to keep themselves, their families and their environment healthy and prosperous.*

*Families and communities can work together to prevent disease outbreaks.*

*This program will empower women to take leadership roles in engaging local government and industry partners in discussions related to land use change and community health.*

## 6 - General public:

*This project provides government, private sector and civil society socially and economically equitable ways to manage land use regionally and globally.*

*The implications of this project's research go beyond the economic, health and environmental effects of land use in Southeast Asia. Faced with growing threats of disease outbreaks and bad practices in land use planning, the global community needs integrated solutions for sustainable development.*

*This project will set the agenda for how international development, health and environmental programs can be brought together under one umbrella. By building a partnership with government and the private sector, this project develops solutions that have real traction to reduce carbon emissions, and promote both a healthier planet and sustainable economic growth.*

### 8.4 Milestones

October 2014: DCoP had first meeting with Deputy Director General from SFD to discuss IDEEAL.

November 2014: DCoP formally introduced to the Director from SFD, and further discussed IDEEAL.

November 2014: DCoP makes good progress in establishing relationship with industry stakeholders Willmar and Sime Darby.

November 2014: DCoP met Chairman of UMS Board of Directors confirming his support for DHRU.

November 2014: DCoP presents on IDEEAL and PREDICT projects to the UN Special Rapporteur on the right of everyone to the highest attainable standard of physical and mental health.

December 2014: DVC confirms that the DHRU had been approved and would be housed within the EcoCampus, an existing Center at UMS. (b)(6) from the FBE would remain as the DRHU lead.

December 2014: Third Stakeholder Roundtable. Participants were presented IDEEAL model in detail, using data from Sabah. DVS Sabah attend meeting for first time.

December 2014: Obtain much needed data set used by (b)(6) for his paper 'Four Decades of Forest Persistence, Clearance and Logging on Borneo.'

December 2014: M&E Plan approved. Y2 Work Plan submitted and approved.

January 2015: UMS Legal Department provided copy of MOU for EHA review.

February 2015: Identified first potential students. Began preparation for Fourth Stakeholder Meeting in Sabah to take place in May 2015.

March 2015: Completed preliminary analysis of subset of DFHC data; UMS approved of MOU with EHA to be signed in May 2015.

May 2015: MOU between UMS and EHA signed.

May 2015: Fourth IDEEAL Stakeholder Meeting. The Malaysian Palm Oil Council sent a representative to the meeting for the first time and the Director of PACOS Trust attends.

May 2015: First meeting held with Research Fellows of DHRU to develop a 16-month plan for seminars, workshops, and toolkit development through the DHRU.

May 2015: CoP, DCoP, and SM met with (b)(6) Department of State Health Sabah to discuss the IDEEAL project and data still needed.

May 2015: First DHRU conference “Links between Land Change, Development and Health” held at UMS. 101 attendees included staff and faculty from UMS, and government, industry and NGO stakeholders involved in the IDEEAL project.

June 2015: IDEEAL invited to present to PACOS community leader meeting on the IDEEAL project. There were 62 Orang Asli participants from 37 communities.

July 2015: All spatial datasets needed for modeling have been received. DCoP met with new acting Director General DVS and new Director of the Veterinary Research Institute and discussed the IDEEAL project.

August 2015: Toolkit Development meeting held with stakeholders in Malaysia.

September 2015: Toolkit tested on communities of Sukau and Bilit in Kinabatangan district.

October 2015: Final Year 2 Stakeholders Meeting held in Malaysia. Final selection of three students for DHRU. First Industry Outreach meeting held in KL.

November 2015: Attended RSPO Annual Meeting in KL and displayed booth in the exhibition hall; first toolkit facilitator training; preliminary agreement from Wilmar to allow us to sample on Ribubonus plantation and conduct HACS with their workers.

December 2015: Briefed (b)(6) from the British High Commission on details of the PREDICT and IDEEAL work in Sabah. Presented two talks related to IDEEAL work at the International Symposium on Biodiversity, Agriculture, Environment and Forestry in Ooty, India.

January 2016: Toolkit presentation to community of Bilit attended by 39 people.



Toolkit presentation to community of Sukau attended by 27 people.

February 2016: Toolkit presentation to management from IOI Group, Morisem, Sepagaya Estate and Genting Plantation attended by 7 people. Application to work on Ribubonus plantation and receive support from Wilmar in terms of lodging and food while conducting DF sampling and HACS in Telupid District had been approved. Site visit and meetings planned for March 14-17. Toolkit presentation in Suan Lamba Genting Plantation attended by 83 workers.

Community Workshop and Toolkit Training Session with PACOS: Introduced toolkit to key representatives and leaders from several communities and began training and identifying key persons to receive additional training as toolkit facilitators.

R Workshop: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants.

Met with Deputy Director of Sabah Forestry Department to discuss findings from IDEEAL modeling. Met with senior staff (including Director and both Deputy Directors), at Sabah Wildlife Department to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model.

March 2016: Met with Director and other senior staff from Sabah State Health Department including Director of their Centre for Disease Control, to present findings from Human Animal Contact Survey, PREDICT disease screening and the IDEEAL model. Met with (b)(6)

(b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST lab work.

Met with (b)(6) to present IDEEAL model and findings from PREDICT disease screening and HACS. (b)(6) to support a position paper to be presented to the Sabah Cabinet and to arrange a time to meet with (b)(6) to present the model.

April 2016: Interviewed by RTM for IDEEAL and PREDICT work. TV crew filmed DEEP FOREST sampling. Presented talk on IDEEAL and DEEP FOREST work at One Health Workforce "Emerging and Zoonotic Disease Colloquium" in Kuching. IDEEAL SCL and other IDEEAL staff from EHA met with Johnson & Johnson VP of Sustainability and presented IDEEAL and discussed future support and expansion of the program (proposal was invited and submitted by EHA)

May 2016:  
First round of analysis for the Human-Animal Contact Survey completed and report shared with Malaysia government partners including Sabah Wildlife Department (see Appendix).

June 2016: EHA submitted a proposal to the Environmental Protection Agency for three years of support for IDEEAL to expand activities to Western Malaysia and include haze events in health analysis;

EHA submitted a proposal to Johnson and Johnson (J&J) for over 3 years for work toward policy change in Malaysia as part of J&J's sustainability objectives. This would include expansion of IDEEAL to Peninsular Malaysia.

July 2016: CoP signed a contract to fund 3 Masters' students through the DHRU; conducted media interviews; CoP and SCL met with Managing Director of Rockefeller Foundation to discuss long-term support for IDEEAL activities.

August 2016: Introductory R Workshop held at UMS with student and faculty as well as key stakeholder participants; Toolkit facilitators' training took place in partnership with PACOS and presented toolkit at a community meeting in Sabah village; EHA Lab Manager and 3 DHRU student abstracts were accepted for presentation at the One Health Ecohealth conference;

October 2016: Submitted an abstract to organize a side-event for the Conference of the Parties - Convention on Biological Diversity to be held in Mexico in December 2016.

November 2016: Attended RSPO for second time

December 2016: Participated in the symposium: Linking Public Health and Ecosystem Management: a One Health Approach at the Conference of the Parties - Convention on Biological Diversity. This symposium was highlighted by the Rio Conventions Pavilion Bulletin Vol. 200 No. 35

<http://enb.iisd.org/download/pdf/sd/enbplus200num35e.pdf>

Two of the DHRU Masters students presented their posters "Zoonotic Viruses Surveillance for the Confiscated Pangolins in Malaysia" and "Soil - Transmitted Helminths Among Rural Indigenous Children in Kota Marudu, Sabah;" EHA Lab Manager presented poster "Assessing viral diversity in non-human primates and bats of Peninsular and Bornean Malaysia" at the One Health EcoHealth conference in Melbourne. DCoP gave a talk on IDEEAL "Analyzing the health value of a tropical forest - New strategies to mitigate pandemic prevention".

January 2017: P&G agreed to use DRU Research Fellows to present Toolkit Workshop in May, which is a KPI for DHRU becoming a Centre.

February 2017: Presented IDEEAL work to MPOB, P&G including (b)(6) from P&G Environmental Stewardship and Sustainability program and (b)(6) (b)(6) for Proforest.

Attended International Workshop on Proboscis Monkey Conservation in Sabah. Discussed IDEEAL work with CEO of Yayasan Sime Darby and raised IDEEAL again with Yayasan Sabah and Sarawak Forestry Corporation.



March 2017: First meetings in Thailand to discuss expansion of IDEEAL work with DNPWPC and BoE DDC MPH.

April 2017: IDEEAL met with new [b)(6)]  
[b)(6)]  
[b)(6)] and had a lengthy discussion about IDEEAL and PREDICT work.

May 2017: EHA Field Manager, Community Engagement Coordinator and Spatial Modeler presented toolkit to 24 smallholder oil palm farmers in Kampung Sungai Jambi, Johor, Malaysia. As part of this presentation, two trained facilitators from the DHRU presented the toolkit to the smallholders with assistance from EcoHealth Alliance staff. This is one of the deliverables for the DHRU and will assist in its establishment as a center.

Community Engagement Coordinator gave a talk “Analyzing the Health Value of a Tropical Forest – New strategies to mitigate Pandemic Potential” at Yayasan Sime Darby’s Environment Day. Presented toolkit activities to 3 teachers and 15 children. DCoP gave a talk “Promoting One Health & Conservation through Zoonotic Disease Surveillance: The PREDICT & IDEEAL Projects in Malaysia” at the 3rd Borneo Tropical Medicine and Infectious Disease Congress 2017.

June 2017: Wilmar ask IDEEAL to prepare land optimization proposal for Nigeria which will be focus of Wilmar palm oil expansion for next 10 - 20 years. DCoP attends the first official Palm Oil & NGO (PONGO) Alliance meeting. DCoP meets with [b)(6)]  
[b)(6)] for Sime Darby to discuss land evaluation we are planning with Wilmar and might be able to help with IDEEAL data for Sabah and Peninsular Malaysia.

[b)(6)] of the DHRU.

Researched and selected potential study areas for Thailand.

July 2017: Estimated country-specific ecosystem services value for areas in the current IDEEAL study region.

August 2017: Meetings in Kuala Lumpur with Sime Darby to obtain detailed cost and oil palm production data for Sabah. Meeting with P&G about potential sources of data acquisition.

September 2017: Meetings in Thailand with Ministry of Health, Kasetsart University Faculty of Forestry, Department of National Parks, and MORU on potential data sources and possible areas for collaboration on research projects.

IDEEAL team met with [b)(6)] in New York to discuss future steps for modeling and publications on IDEEAL project. A road map was outlined on how to apply the IDEEAL modeling on a global scale.



October 2017: Successful meetings with stakeholders.

November 2017: Draft MOU for MORU process has begun; Data access meetings successful.

December 2017: Spatial Modeler and Community Engagement Coordinator led an Introduction to Geographic Information Systems (GIS) and Mapping workshop at UMS, organized by the DHRU; DHRU website finalized with input from all partners and is now live at this link: <http://www.ums.edu.my/dhru/en>.