

ROUNDUP READY PLUS™
WEED MANAGEMENT SOLUTIONS

ROUNDUP READY® XTEND CROP SYSTEM



Reflections on Building FTO

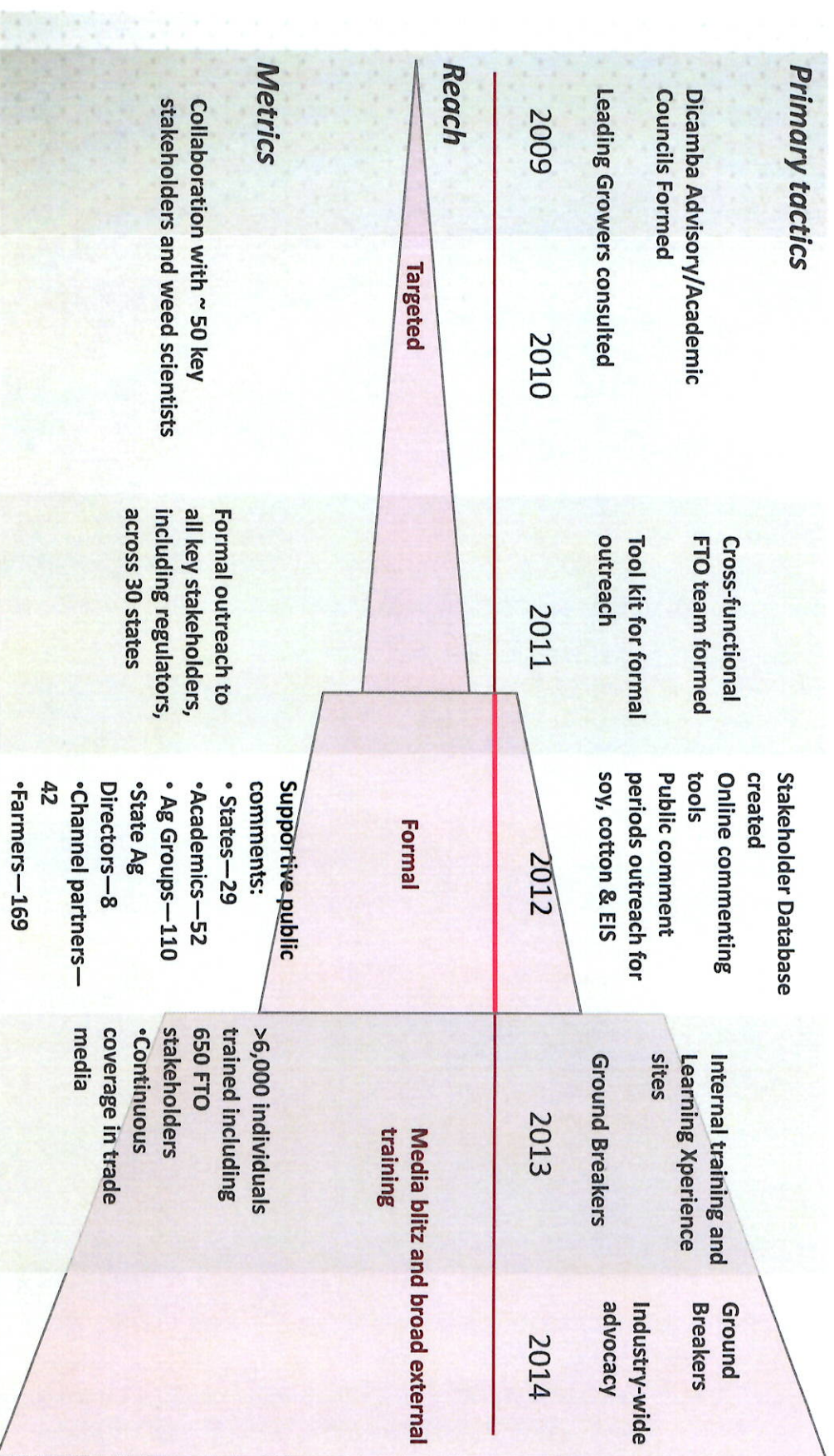
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General Principals to Assist in FTO



- Listen
- Anticipate issues
- Define who are the stakeholders
- Engage in dialogue with stakeholders
- Dilemma share with advocates and key supporters
- Establish third collaborations
- Transparency
- Develop tools to facilitate success

Securing a broad base: US example



Excellent Ag Sector Support for Roundup Ready® Xtend Crop System USDA Comment Periods



Dicamba USDA Public Comment Period

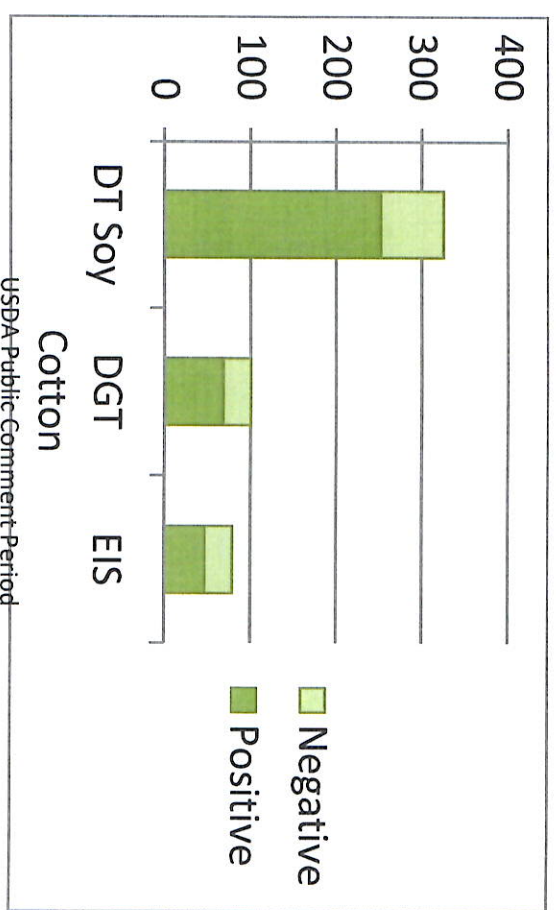
Supporters

- Academics, Recognized experts, leading institutions and researchers
- Individual farmers/farming operations
- Grower/farmer groups
- Industry associations
- Retailers/dealers
- Spray/equipment experts
- State Departments of Agriculture
- Broad geographical distribution – 28 states

Opponents

- Sensitive crop interests
- Anti-GM in general
- Anti-pesticide
- Concerned about long-term effects on human health and environment
- Pro-labeling

Overall USDA MON Comment Period Numbers



	Positive	Negative	Neg. Sub.	Total
Soy	252 (78%)	73	28	325
Cotton	68 (68%)	32	3	100
EIS	47 (60%)	32	3	79
Total	367 (73%)	137	34	504

Academic Engagement



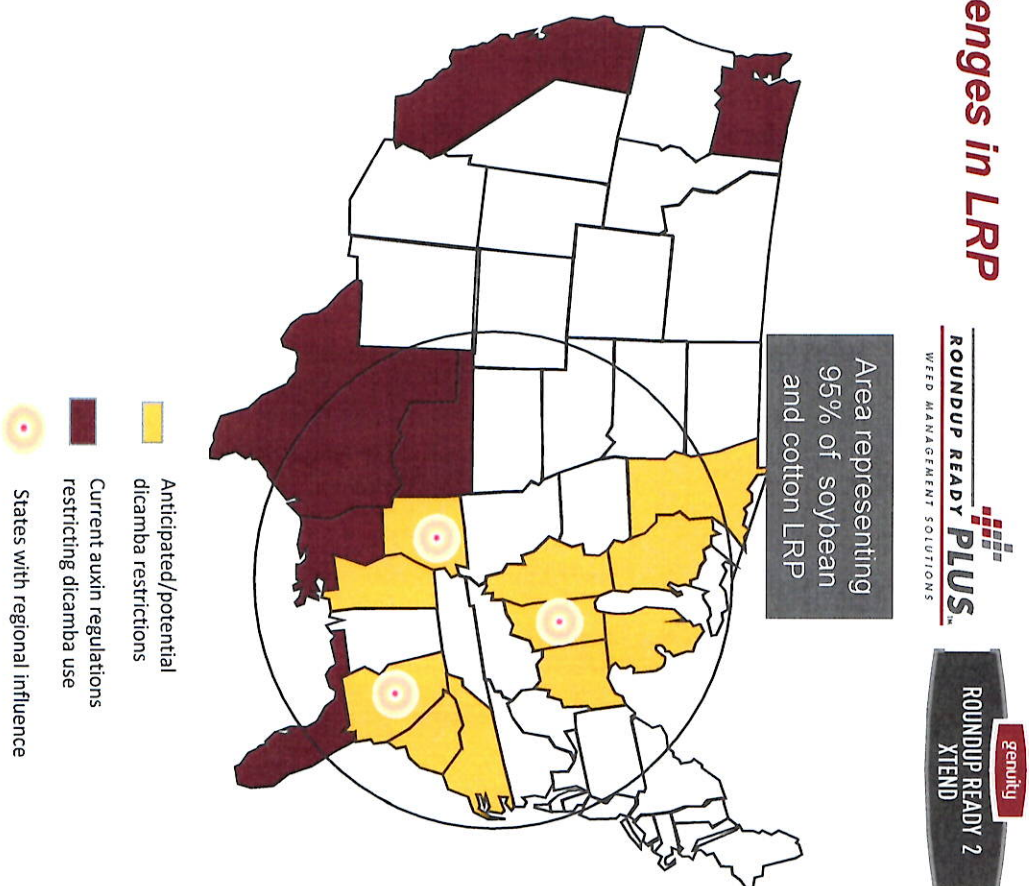
Gain academic alignment and support through collaborative research, providing key product information and utilizing their input on commercialization

Academic Support of Deregulation	
Field Testing of Herbicide Drift Potential	
Field Testing of Herbicide Performance	
Support of Application Requirements	
Support of New Herbicide Formulation	

Anticipate state/provincial FTO challenges in LRP geographies: US example

- State FTO Priorities
1. Address existing dicamba and auxin restrictions and regulations
 2. Address anticipated and potential dicamba restrictions in states where concerns exist
 3. Ensure key regional states have voluntary and effective training model

- Federal FTO Priorities
- Grower Led Regulatory Advocacy Campaign



1. *Journal of the American Medical Association*, 1997; 277: 1001-1005.



Post Learning Xperience Survey

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	Number
Events	25
Locations	19
Participants	628
Grower groups	37
Dept of Ag and regulators	20
Academics/ext.	30+
Affiliated industry	10
Media	20
Other	6



Questions from Participants



- The range of chemistries tank deactivator deactivates? Concern farmers will think works on everything.
- Will there be temperature restrictions?
- Can you include the droplet size and % fines as requirements versus specifying certain tips?
- Can you share your material with the Extension Pesticide Educations programs?

Key Themes and Feedback



- Seeing is believing
- Encouraged prescriptive labeling of application requirements
- Consider mandatory training/required training
- Look at 360° spray buffers or upwind spray buffer
- Attendees were overwhelmed with acronyms
- Use sensitive crops (tomatoes) for drift/volatility demo
- Lots of questions about nozzles, push to give nozzles to growers
- Concern regarding glyphosate resistant kochia
- Learn from the Command label lessons

Dicamba Advisory Council

Launched in 2009



Dicamba Advisory Council

- American Soybean Association
- National Cotton Council
- Sensitive Crop Growers
- Agribusiness Council of Indiana
- Illinois Farm Bureau
- BASF
- Case IH
- John Deere
- Tee Jet
- Brandt Consolidated
- Growmark
- CPS
- Helena Chemical
- Winfield Solutions, LLC
- Purdue
- Southern Illinois University
- University of Georgia
- University of Illinois
- Michigan State University
- University of Wisconsin

Education

Effectiveness

Integration into
Weed Management

Stewardship

Off-Target Movement

Objectives of the Dicamba Advisory Council



- Proactively identify the potential opportunities, issues and solutions that may arise with the launch of Roundup Ready® Xtend system
- Engage industry stakeholders from a variety of fields involved with the Roundup Ready® Xtend system technology to gain insights and perspectives on the best practices that support a successful commercial launch of the technology and system
- Equip stakeholders with information, resources, tools, and best management practices necessary to ensure responsible usage of the product, which ultimately will provide benefits to all parties

Expectations for the Dicamba Advisory Council



- Provide candid input and perspectives on the Dicamba Tolerant technology as it is being developed
- Communicate with represented stakeholder groups as the technology is introduced
- Engage with a variety of industry leaders from various fields
- Continually serve as a *point of contact* for Dicamba Tolerant technology information and insights
- Treat information with respect

Dicamba Advisory Council Structure



- Two in-person meetings a year, plus conference calls
 - Meetings typically consist of two half days (afternoon of day one and morning of day two)
 - Agenda includes update presentations, small group discussions and research tours
 - Third party provides facilitation support for the meetings
- Information shared through DAC should be respected
 - The discussions during DAC meetings are meant to be collaborative dialogue around solving problems and correcting false information
 - Candid dialogue and feedback encouraged-all thoughts and suggestions are carefully considered
 - Non-confidential

Potential Key Issues around Dicamba Technology

1. Drift
2. Volatility
3. Equipment contamination
4. Non-tolerant crops (e.g. RR soybeans/cotton)
5. Auxin class of chemistry
6. Performance – weed control
7. Pricing/value
8. Sensitive, high-value crops (e.g. nursery)
9. Homeowner issues/concerns and urban sprawl
10. Organic growers
11. Activists/environmentalists (safety issues with another chemical)
12. Food safety/residue
13. Implications on insurance/liability (e.g. applicator's liability)
14. Potential weed resistance
15. Impact on Monsanto's sustainability message
16. Misapplication issues
17. Potential damage to public perception of crop protection industry

Influence of the DAC on Commercial Plans

Address volatility

- Establish restrictions on most volatile formulations as part of Xtend crop system



Sensitive Crops

- Establish residue tolerances for minor crops
- Support and promote driftwatch
- Perform regional drift studies on local sensitive crops
- Address tank contamination



Training and Education

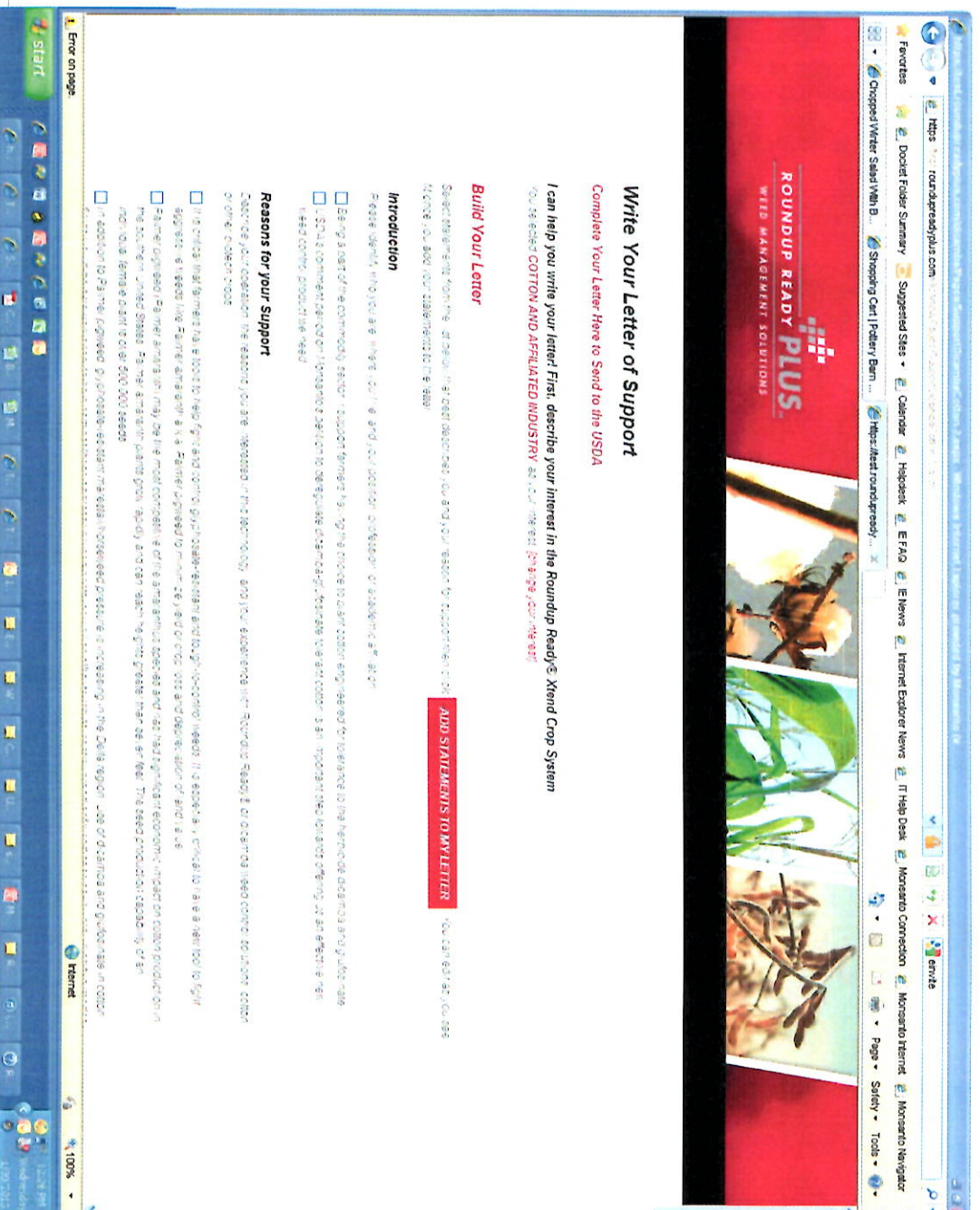
- Make Best management Practices required
- Training farmers and applicators



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Cotton Comment Tool Improved



Industry Initiatives Reinforce Stewardship Messages

Align Academics, Farm Groups and Input Providers

United Soybean Board Initiative

- United Soybean Board approved funding of broad initiative focused on stewardship of weed management tools
- Aligns with Roundup Ready PLUS
- Reinforces Monsanto's anticipated Roundup Ready Xtend Crop System "Application Requirements"



WEED OUT RESISTANCE

- Know Your Neighbors
- Know Weed Growth Characteristics
- Know How Seed Characteristics Affect Resistance

IN THE FIELD

- Crop Rotation
- Herbicide Mode of Action Rotation
- Tillage Practices

SPRAY ATTENTION

- Provide Mode of Action and Resistances
- Optimize Management
- Know Environmental Conditions

THE BOTTOM LINE

- Risk Management
- Cost-Sensitivity of Practices
- Know the Cost of Poor Weed Control



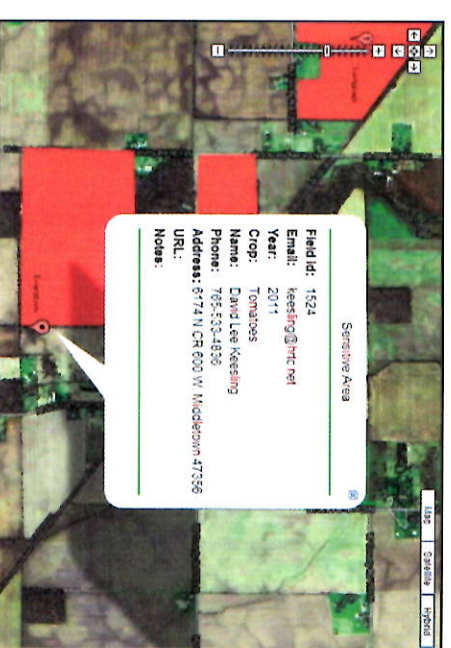
Industry Initiatives Reinforce Stewardship Messages



Align Academics, Farm Groups and Input Providers

Purdue University Drift Watch Program

- Program has grown to nine states
- Represents an alternative to additional regulation
- Monsanto and other manufactures supporting financially
- Purdue is setting up dedicated entity to drive growth, improve processes and address needs of diverse stakeholders
- Roundup Ready Xtend Crop System training and Application Requirements recommend applicator use where available



Roundup Ready Xtend FTO Road Map



Mission

Ensure Xtend Crop System success by enabling and protecting our freedom to operate

Strategic Objectives 2013-2016

Support trait approvals and chemistry labels

Anticipate and address issues

Collaborations and Partnerships

Build acceptance and demand for Xtend Crop systems

Enablers

Training and Education

Stakeholder Engagement

Integrate FTO into business plans

Key Deliverables FY 2014

Strategic Objectives

- Build grassroots and grassroots support for a timely regulatory approval process and Grower group leadership in "Stop the Clock" campaign
- Build and implement state plan to address existing auxin regulations (AR, LA, MS)
- Prepare to proactively address any new state regulations (GA, IN, MN)
- Integrate Xtend application practices and principles into USB's Take Action program
- Prepare for and ensure strong support during next/NOI public comment period
- Ensure key stakeholder promotion and messaging for Xtend crop System
- Promote and participate in Driftwatch

Enabling

- Expand VIP-FTO dedicated training sessions at 2014 Learning Xperiences
- Establish training straw model and test case for GA and Purdue model
- Develop voluntary, incentive-based training program for 2015 launch
- Leverage investment made in DAC in launch plans
- Significantly expand our third-party engagement and support
- Include FTO issue management and deliverables in commercial plans
- Develop tracking metrics to measure stakeholder engagement and acceptance

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DAC Current Participants



- Academics (4)– southern, northern, central
- Growers (6) soybean, cotton sugar beet and specialty
- Equipment manufacturers (3)
- Retailers (4) North, central and southern
- Food/specialty assoc
- Grower groups
- USDA – IR-4
- Crop consultant
- Applicator expert
- Licensee
- BASF

Stakeholder: Dicamba Susceptible Growers

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Off-target movement	<ul style="list-style-type: none"> • Crop loss • Lawsuits and financial implications • Damaged quality 	<ul style="list-style-type: none"> • Understand movement of the herbicide/molecule in varied environments • Application research • Education and stewardship • Apply the lessons from glyphosate drift to dicamba; 	
	<ul style="list-style-type: none"> • Negative press around pesticides, homeowners and organic growers • “Right to farm” 	<ul style="list-style-type: none"> • Encourage use of least-risky formulations vs. the use of generic herbicides • Restricted use application? • Spray buffer zones? • Spray timings • Indemnity fund for crop loss? 	
		<ul style="list-style-type: none"> • Drift awareness signs to communicate between neighbors 	
Managing Relationships	•Co-existence		

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Stakeholder: Processors/Wholesalers (Specialty Crops)

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Loss of contracted product	<ul style="list-style-type: none"> Loss of short-term business 		
	<ul style="list-style-type: none"> Loss of long-term business 	<ul style="list-style-type: none"> Understand movement and impact on multiple crops and maturity stages in varied environments - data 	
	<ul style="list-style-type: none"> If barriers to operating get too difficult, loss of contractors willing to grow specialty crops (risk/reward is out-of-balance) 	<ul style="list-style-type: none"> Understand production practices by region 	
	<ul style="list-style-type: none"> Potential for lost markets Law suits 	<ul style="list-style-type: none"> Work with state vegetable grower associations www.driftwatch.org 	

www.Driftwatch.org

Internet Explorer - Microsoft Internet Explorer provided by Microsoft (OS: 2001.110.0)

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address: <http://driftwatch.agriculture.purdue.edu/applications.html>

Public Drinking Water Supply
☐ Check to view county lines.

Map Satellite Hybrid 3D

0 100 miles

Zoom to your area and click a polygon to query

Data Steward | Contact us at (765) 427-3472 | [Disclaimer](#)

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Done

start

Internet

11:55 AM Thursday 11/18/2009

driftwatch is a tool to help protect pesticide-sensitive crops and habitats from the drift that sometimes occurs during spray operations

States

- Indiana
- Ohio
- Missouri
- Michigan
- Illinois
- Wisconsin

Stakeholder: USDA

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Approval of the trait	Without approval of the trait, commercialization isn't possible.	<ul style="list-style-type: none"> Strong regulatory package Stakeholder engagement on public comment periods 	
Freedom to operate, above and beyond the requirements	If the trait gets approved, lawsuits could trump a growers ability to choose to plant the technology	<ul style="list-style-type: none"> Strong regulatory package anticipating environmentalist claims (EIS) Stakeholder engagement on public comment periods Gain acceptance with stakeholders Anticipate, anticipate! 	
Label amendment for the dicamba formulation	Illegal to apply dicamba on dicamba-tolerant crops without it	Company Confidential	

Stakeholder: EPA & State Pesticide Regulators

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Off target movement	Mandated buffers, use restrictions	Proactively implement drift reduction systems and broad stewardship with training	
Residue tolerances	Must be established to commercialize	Appropriate studies to support usage of technology	
Environmental impact	Endangered species, groundwater, restricted use	Stewardship of product; safety studies	
Weed Resistance	Mandated use with restrictions	Directions for use consistent with resistance management strategies	

Stakeholder: Academics

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Local Adoption of Technology	Localized recommendation for growers:	<ul style="list-style-type: none"> • Key academics to influence peers, extension activity • Demos for growers (answer plots) • Research on spray drift impact on multiple crops/stages • Production practices by region 	
	<ul style="list-style-type: none"> • Weed control • Resistance management • Germplasm (variety testing) 		
Education & Stewardship	How to protect this technology? Extent life of technology	Weed control systems recommendation, Demonstrations	
Basic Research opportunity		How to tank cleanout, to address volatility, spray drift, droplet size	

Stakeholder: Retailers/Custom Applicators/State Agribusiness Organizations

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Off target movement	Liability, customer satisfaction	Proper equipment, application stewardship, training modules, certification programs, specific and targeted, commercial and grower Hooded applications Incentives to dealers to educate	
Contamination	Liability, customer satisfaction	Same as previous, cleanout protocols information and resources	
Misapplication to wrong field	Liability, customer satisfaction	Same as previous, field ID (important early in adoption) to ensure minimal mistakes Communicate how Monsanto effectively measures value and shares across channel.	
Pricing and value	Product adoption		

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Stakeholder: Farm Managers and Consultants

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Price and value	Product adoption	Communicate how Monsanto effectively measures value and shares across channel.	
Correct recommendation in alignment with product use guidelines.	Dissatisfied customer, unmet expectations	Early engagement, training, field demonstration and education on use.	
Addition of Chemistry	Tank incompatibility, effectiveness	Label guidelines, training, timing	

Stakeholder: Media

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Misunderstanding; Overregulation	Loss of freedom to operate	<ul style="list-style-type: none"> Increase information available to the general public / media 	
Commercialization delays	Inability to offer a new product to farmers		
Additional Lawsuits	<ul style="list-style-type: none"> Loss of freedom to operate Inability to offer a new product to farmers 		
		<ul style="list-style-type: none"> Balance commercial opportunity vs. weed control BMP Reinforce agronomic best practices Consistent messaging from Monsanto corporate, technology development, third-parties and academic experts 	
Demonstrate commitment to addressing weed resistance / increasing value	<ul style="list-style-type: none"> Improved image for Monsanto in the agricultural community 		

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Stakeholder: Dicamba-tolerant Grower (see value in trait)

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Weed management tool for resistant/hard-to-control weeds	Responsibility and stewardship that comes with the trait	<ul style="list-style-type: none"> Grower education Define financial value to the grower Incentivize dealers to educate 	
Yield component			
Demonstrate yield and other agronomic benefits of technology			

Stakeholder: Dicamba-tolerant Grower (see no trait value)

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Acceptance by grower who doesn't have resistance issues	Acceptance: Why should I pay for something I don't need?	<p>Define value thru education:</p> <ul style="list-style-type: none"> Greater sustainability of weed control system "Flexibility"/added disease resistance "Protection" from your neighbor 	

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Stakeholder: Equipment/Spray Manufacturers

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Equipment contamination	Identify components that need to be cleaned	<p>Education of tank clean-out</p> <p>"Dicamba deactivator"</p> <p>Systems improvement:</p> <ul style="list-style-type: none"> Improvements to clean booms (removable end caps to clean booms) Inline injection system <p>Education on spray systems, nozzles, (computer interface)</p> <p>Evaluations of new systems:</p> <ul style="list-style-type: none"> Nozzles Boom systems 	
Off target spray	Spraying chemical on "non-traited" acres	Automatic sprayer shut-off	

Particle drift

Stakeholder: Processors/Exporters

Issue / Opportunity	Implication	How to Address	Next Steps/Owner
Export Market	Maintaining export markets with trait introductions	<ul style="list-style-type: none"> Communication of approvals of traits in major export markets (Mexico, China are main markets – approval before trait launch) Effective channeling (does not work for countries with zero tolerance) Establish communication that DT soy are substantially equivalent to non-DT soy (germ, seed composition, disease susceptibility, etc.) => USDA approval 	
Quality/Processing quality (meal)	Testing for quality of product	<ul style="list-style-type: none"> Valuation of trait and chemistry Show added value which influences adoption rate 	
Maintaining/increasing profitability	Maintain weed control/system, commodity price		

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