



KIT Royal
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PIATA 2019 Outcome Monitoring Report AGRA Ethiopia

Consolidated report

KIT Royal Tropical Institute, Amsterdam

30 April 2020

Colophon

Correct citation:

KIT, 2020. *Ethiopia Outcome Monitoring Report 2019, AGRA-PIATA Programme*. Alliance for a Green Revolution in Africa, Nairobi; KIT Royal Tropical Institute, Amsterdam.

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Language edit: WRENmedia

This report has been commissioned by AGRA to monitor its PIATA programme progress in Ethiopia.

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Acronyms

ACC	Agriculture Crop Clusters
AGRA	Alliance for a Green Revolution in Africa
AGP	Agricultural Growth Plan
ASE	Agri-Service Ethiopia
ATA	Agricultural Transformation Agency
AU	African Union
BoANR	Bureau of Agriculture and Natural Resources
BMGF	Bill & Melinda Gates Foundation
CAADP	Comprehensive Africa Agriculture Development Programme
COMESA	Common Market for Eastern and Southern Africa
DA	Development agent
DSM	Direct Seed Marketing
EARS	Ethiopian Agricultural Research System
EIAR	Ethiopian Institute for Agricultural Research
ESE	Ethiopian Seed Enterprise
ESA	Ethiopian Seed Association
FAO	Food and Agriculture Organization of the United Nations
FRI	Farm Radio International
FSC	Farmer Service Centre
FTC	Farmer Training Centre
GDP	Gross Domestic Product
GIZ	German Development Agency
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
ICARDA	International Center for Agricultural Research in the Dry Areas
ICT	Information and Communications Technology
IFAD	International Fund for Agricultural Development
IFDC	International Centre for Fertiliser and Agricultural Development
IMPACT	Improving Market-led Production of Selected Agricultural Commodities in Targeted Woredas of Amhara and Tigray Regions
ISSD	Integrated Seed Sector Development
ISFM	Integrated Soil Fertility Management
ISTA	International Seed Testing Association
KII	Key informant interview
KIT	Royal Tropical Institute
MBI	Menagesha Biotech Industry
M&E	Monitoring and evaluation
MIRA	Micro Reforms for African Agribusiness
MoANR	Ministry of Agriculture and Natural Resources
MT	Metric tonne
NARS	National Agricultural Research System
NVRC	National Variety Release Committee
OPV	Open-pollinated variety
PIATA	Partnership for Inclusive Agricultural Transformation in Africa
R&D	Research and development
RARIs	Regional Agricultural Research Institutes

SEPDA	South Ethiopia Peoples' Development Association
SME	Small and medium-sized enterprise
SNNPR	Southern Nations and Nationalities Peoples Region
SPC	Seed producer cooperative
SSCCP	Strengthening Seed Certification Capacity Programme
TASAI	The African Seed Access Index
USAID	United States Agency for International Development
US\$	US dollars

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1 Summary of results and key messages

1.1 Introduction

The Alliance for a Green Revolution in Africa (AGRA) is catalysing and sustaining an inclusive agricultural transformation in Africa by increasing incomes and improving food security for 30 million farming households in 11 focus countries. Since 2006, AGRA and its partners have worked across Africa to deliver proven solutions to smallholder farmers and thousands of African agricultural enterprises. The alliance has built the systems and tools for Africa's agriculture: high quality seeds, better soil health, and access to markets and credit, coupled with stronger farmer organisations and agriculture policies.

AGRA's theory of change is that sustainable agricultural transformation can be facilitated through a combination of:

- Policy and state capability – investments to work with and support governments to strengthen execution and coordination capacities, enhance transparency, accountability and enabling policy environment;
- Systems development – investments to build downstream delivery systems while providing support to local private sector to scale technologies and services for better productivity and incomes; and
- Partnerships – to facilitate alignment between government and private sector, improving integration and coordination for investments in agriculture.

In Ethiopia, AGRA focuses on (AGRA, 2017):

- Support to the Agricultural Transformation Agency (ATA) and policy engagement through:
 - strategic support to the ATA;
 - provision of advisory support to the ministry of agriculture and regional bureau in order to boost delivery capacity;
 - facilitate implementation of the agriculture commercialisation cluster (ACC) strategy;
 - facilitate the creation of an enabling environment that attracts increased private sector investments.
- Scaling up system and farmer-level initiatives in Amhara, Oromia, Southern Nations and Nationalities Peoples Region (SNNPR) and Tigray regions:
 - strengthen input supply systems and linkages to output markets to facilitate the uptake of yield-enhancing agricultural technologies;
 - enhance input distribution and accessibility through electronic voucher systems;
 - expand market access through value addition, structured trade, quality enhancement and aggregation.

AGRA's country support in Ethiopia is of a lighter touch compared to other AGRA countries, as AGRA consider the ATA to be a good model for the rest of the continent on establishing a delivery agency that strengthens sector planning, coordination and accountability.

AGRA expects to improve food security and increase incomes for at least 4.7 million smallholder households directly and a further 4.7 million indirectly, targeting five key crops:

haricot beans, maize, sorghum, teff and wheat. Deployment of this strategy in Ethiopia began in 2017, but its country office was installed effectively in the second quarter of 2019. The total budget for the Partnership for Inclusive Agricultural Transformation in Africa (PIATA) programme is about US\$15 million. With these funds, AGRA invests in different bodies of work as below:

- an expected 24% of the budget will be invested in country support and policy engagement regarding policy and legislation regarding the seed sector and fertiliser use;
- AGRA has set up two consortia in the four target regions focusing on productivity enhancement and market access.

The strategy is aligned with the government's priorities and contributes to the need for a strong agricultural sector with effective coordination and implementation capabilities.

For the 2019 outcome monitoring, AGRA selected the seed system and the input system for the qualitative systems review. A quantitative household survey, as carried out in other AGRA countries, was not implemented in Ethiopia.

The summary results and key messages integrate findings and highlights from two separate, interrelated field data collection activities, namely a qualitative systems study (Part 1) and a rapid survey of AGRA-supported small and medium-sized enterprises (SMEs) (Part 2). The results and observations here are drawn from a limited number of data sources. The results specifically address AGRA outcome 1 (strengthened agricultural input systems, technology development and supply chains).

This report should be read keeping in mind the limitations of the study. The system analysis was limited to two systems, and field data collection was limited to one week per system. Hence the system analysis is not fully comprehensive. The system analysis makes an effort to place the entirety of AGRA investments in Ethiopia, and its impacts on the system, in context. The SME performance survey was designed for a rapid and cost-effective data collection and will serve as a baseline for measuring change over time.

1.2 System analysis

Seed system

The seed system in Ethiopia is still performing below the level required to achieve Ethiopia's ambitions under the Agricultural Transformation Agenda. In particular, the shortages of early generation seed (EGS), the weak linkage between research and extension hampering the promotion of new varieties, the lack of market information on seed demand and supply and the limited capacity for seed multiplication are considered key bottlenecks. Lack of implementation and enforcement of seed regulations have also been mentioned as constraint. The private sector in the seed system remains weak.

AGRA's focus is on addressing some of the key constraints in the seed system: supporting seed policy reforms, increasing the capacity of Ethiopian Institute for Agricultural Research (EIAR) to produce EGS, strengthening capacities of seed regulatory bodies responsible for quality assurance, and promoting improved crop varieties through demonstration plots. Most interventions supported by AGRA effectively started in 2019, simultaneous with the establishment of AGRA's country team in Ethiopia. AGRA looks for catalytic contributions to

the development of the seed sector in Ethiopia in the presence of major development partners (e.g. the Integrated Seed Sector Development – ISSD) and ATA. The grant to boost EGS production is a case in point. It is expected, however, that impact at farmer level will be modest (in line with the limited intervention budget), unless lessons on effective approaches for market-led approaches to boost uptake of improved technologies can be scaled afterwards.

Early results and recommendations regarding AGRA's support to the seed system are as follows:

- AGRA is a relatively small donor in the seed sector compared to ISSD and ATA who have more resources and have supported the Ethiopian seed sector for a longer period. Therefore, AGRA has less clout to trigger major sector transformation and reform. However, AGRA is operating in the specific niche of quality assurance, and is unique as it does provide direct financial support to the Ministry of Agriculture and Natural Resources (MoANR). Importantly, AGRA makes a clear link between its efforts in seed sector development, and agricultural transformation by smallholder farmers through intensification of their production;
- AGRA's support to MoANR (e.g. Strengthening Seed Certification Capacity Program – SSCCP) is very relevant, but more could be done to establish independent regulatory authorities at federal and regional level. Many weaknesses in the seed sector relate to the inability of the regional quality assurance services to provide adequate and efficient services to seed companies, seed producers and farmers. AGRA funds can contribute to systemic change in this area;
- In order to leverage the relatively small funds and create impact, AGRA could focus specifically on governance and regulatory level processes in the seed sector. Pragmatic investments can also be made in other areas, such as supporting the International Seed Testing Association (ISTA)-accreditation of seed laboratories;
- As most interventions under the PIATA programme started effectively in 2019, it is too early to give any indication of the sustainability of AGRA's current support for the seed system. The SSCCP is likely to produce long-term impacts by improving the implementation of policies and regulation. However, it is unlikely that support for EIAR for EGS production will produce systemic change in the long term. The same can be said on the long-term impact of the consortium projects on seed use, as it is not clear how the promotion of new varieties will be sustained after the project lifetime.

Input system

The input system in Ethiopia is largely controlled by the Government of Ethiopia (GoE) through parastatals, the Bureau of Agriculture and Natural Resources (BoANR) and the multi-purpose cooperatives. Fertilisers are imported by a single parastatal enterprise and subsequently distributed to the unions and multi-purpose cooperatives as indicated by the BoANR. Although the GoE tries to meet farmers' demands through this centralised distribution system, the availability of different types of fertilisers vary highly from year to year. In 2017, the average use of nitrogen and phosphate was only 9 kg/ha for each. In recent years, GoE has invested in soil mapping, resulting in the Ethiopian Soil Information System and Fertiliser Recommendation atlases. The aim is to produce blended fertilisers in Ethiopia (done by a foreign private enterprise) that are suitable for the different agro-ecological zones and crops. There is no other private sector engagement in the production of fertilisers except for an SME that produces bio-fertilisers for legume crops.

The ATA has introduced the Farm Service Centres (FSC), which function as one-stop input supply and service centres for farmers. FSCs can be owned by private individuals as well as by cooperatives. Entrepreneurs at *kebele*¹ level are linked to the FSCs to increase the number of last-mile input suppliers. There is thus an emergence of private sector input suppliers, though this is still in its infancy. AGRA provides support (training, seed money) to these last-mile input suppliers through the consortium projects.

Early results and recommendations regarding the input system include:

- AGRA is one of few development partners to support the input system, and is therefore considered as very relevant. However, the support remains limited and is thus considered to be relevant as a proof of concept – particularly in regard to the market-led approaches implemented by the consortia – rather than being expected to achieve system change;
- Lack of appropriate fertilisers (chemical and organic) is still a major issue in Ethiopia and limits agricultural productivity. AGRA's support to FSCs and last-mile agro-dealers in order to improve access to fertilisers is thus relevant, but more can be done to achieve system change. There is still a lack of competition within the input supply chains (both seed and fertiliser), and AGRA could play a policy advocacy role to further liberalise the input supply chains to encourage more private sector participation in the procurement and distribution of seeds and fertilisers;
- As the activities of the current phase started in 2019, it is too early to indicate the impact. However, the consortia projects are considered to be particularly relevant as proof of concepts for market-led approaches. They are not expected to achieve impact at the system level.

1.3 SME performance

An important pathway of change of the PIATA programme is supporting the development of SMEs operating in agricultural value chains and providing support services to agricultural value chains. In Ethiopia, AGRA is focussing on SMEs involved in last-mile input distribution and in crop produce aggregation. The SME survey in Ethiopia includes cooperatives and unions because of the important role they play in agricultural value chains. Key findings from a rapid SME survey indicate that:

- The seed enterprises and seed unions and cooperatives show a moderate performance in terms of business resilience, financial stability and human capital; technology investment is below moderate as research and development (R&D) is mostly done by public research institutes;
- The FSCs have been established recently with the mandate to provide one particular service (input supply), explaining their low scoring on business resilience and technology investments. However, the financial stability and human capital are rated as good and moderate, respectively;
- The multi-purpose cooperatives show low scores on business resilience, human capital and technology investments, which is inherent to their mandates and nature. The financial stability is rated as good;
- The agri-value chain actors are mostly multi-purpose cooperatives who act as aggregators or processors. The moderate performance in terms of business resilience, financial stability, human capital and technology investment should be

¹ A *kebele* is the smallest administrative division in Ethiopia.

understood within the context of their mandate. They score a poor performance in technology investment.

2 Objectives and scope

The Royal Tropical Institute (KIT) was contracted by AGRA to implement annual outcome monitoring of its activities under PIATA 2017-2021.

The annual outcome surveys have three different, interrelated objectives:

1. Understand AGRA's progress towards desired outcomes, both for internal and external reporting;
 - a. Elicit data and insight into the effect of AGRA interventions on its beneficiaries
 - b. Provide insight into sustainable improvement of the performance of agricultural sector support systems
2. Learn about the performance of AGRA interventions to allow for intelligent evidence-based adaptation of implementation;
3. Document lessons learned for improved design of future AGRA, but also external, interventions.

These objectives are realised through a combination of quantitative and qualitative methods, implemented by a team of qualitative and quantitative experts.

The Ethiopia team consisted of:

- an international qualitative data collection in agriculture expert;
- two national consultants in agricultural monitoring and evaluation (M&E);
- an international quantitative agricultural data collection expert (based in The Netherlands, for desk-based SME data analyses).

No priority crops were selected by AGRA for reporting. AGRA selected the seed system and input system as the priority system domains for 2019. This report describes the qualitative data collection and results for these two systems.

Primary data was collected by the qualitative team in Addis Ababa, Tigray, and SNNPR over a period of two weeks in December 2019. Information was primarily collected via a number of informant interviews and group discussions. Most key informants were identified by AGRA before arrival of the study team, a small number were referrals that were suggested whilst in-country. Secondary data provided by key informants and online documents in the public domain were also used as data sources.

SME surveys were administered to 36 randomly selected companies and business linked to AGRA interventions.

This report should be read keeping in mind the limitations of the study. The SME performance survey was designed for rapid and cost-effective data collection. The system analysis was limited to two systems, and field data collection was limited to one week per system. The report results should therefore be interpreted with caution. The SME performance measurement will serve as a baseline for measuring change over time. The system change studies have made an effort to place the entirety of AGRA investments in a country, impacting on the system, in context. The fieldwork, however, could only cover a portion of AGRA's intervention portfolio because of the limited field time.

PART I: Qualitative systems analysis

3 Introduction systems analysis

3.1 Agricultural policy context

Ethiopia is the second most populous nation in Africa with 109 million people. Though one of the poorest countries, it is also one of the fastest growing economies in the region. Between 2007/08 and 2017/18, Ethiopia reported high rates of economic growth of 10% per year (World Bank, 2019). The Ethiopian economy is heavily reliant on agriculture (IFDC, 2015), which contributes 45% to Gross Domestic Product (GDP), whilst employing 73% of the population. Crop production is increasing but this is mainly linked to area expansion rather than productivity increase (MoANR, 2019). The agriculture sector is characterised by low input, low output and labour-intensive, rain-fed farming systems (IFDC, 2012).

Ethiopia has known a strong public sector and parastatals since the start of the socialist-oriented policies of the Derg regime in 1975. Reforms for market liberalisation started in the 1990s and the GoE has promoted private sector development in its policies ever since through its Growth and Transformation Plan (GTP) in particular. After more than a decade of sustained public sector-led growth, the GoE has revised its growth strategy to allow an even greater role for the private sector in driving growth and job creation. As these reforms are fairly recent, the private sector remains young while state-owned enterprises continue to play a heavy role (IFC, 2019). Hence, the private sector in Ethiopia is considered as relatively 'weak' in comparison to the other AGRA countries despite the major reforms and progress made in the last decade. The 'Doing Business' index² currently ranks Ethiopia as 159th out of a total of 190 countries. For many indicators, Ethiopia scores close to, or slightly above, the regional average for sub-Saharan Africa, except for the indicators 'getting credit' and 'protecting minority investors', which show a poor performance (World Bank, 2020). Compared to the other countries where AGRA is intervening, Ethiopia ranks the lowest in the Doing Business index.

Agricultural transformation is high on the political agenda of the GoE. The Agricultural Growth Program (2010-2015) focused on i) agricultural production and commercialisation, and ii) productive agricultural infrastructure development (e.g. small-scale irrigation, market infrastructure). The current GTP (GTPII; 2015-2020) continues to focus on the modernisation of the agricultural sector, amongst other aims. The long-term goal is to become a middle-income country by 2025 (NPC, 2016). Despite its ambitions, the 2016/2017 fiscal year showed a trade deficit due to a weak performance of exports (including agricultural commodities). The subsequent shortage of foreign currency resulted in a declining import (including agricultural goods). This result has increased Ethiopia's determination to improve the country's export performance (NPC, 2018).

The GoE has committed a significant portion (16.8%) of its budget to the intensification and commercialisation of agriculture (AU, 2017). The agricultural sector grew by 6.7% during the period 2015-2017, even though productivity levels of the major staple crops did not increase as much as anticipated. In particular, the improved seed supply and agricultural

² The Doing Business Index of the World Bank ranks economies on their ease of doing business, from 1–190. A high ease of doing business ranking means the regulatory environment is more conducive to the starting and operation of a local firm. The rankings are determined by sorting the aggregate on 10 topics, each consisting of several indicators, giving equal weight to each topic. For more information, see: <https://www.doingbusiness.org/>

mechanisation services have shown underperformance (NPC, 2018). And although the public expenditure on the agricultural sector is high, the expenditure on agricultural R&D is only 0.29% of agricultural GDP, which is considered low compared to other countries (Beintema & Haregewoin, 2018).

In 2017, Ethiopia was making good progress towards implementing the Malabo declaration (Table 1). The progress score (5.31) in 2019 remained very similar to the score (5.35) in 2017. However, the score is below the benchmark for 2019, which was set at 6.66 points and Ethiopia is therefore currently being scored as 'not on track'.

Table 1: Ethiopia's 2017 progress towards implementing the Malabo declaration on agricultural transformation in Africa (AU, 2017)

Five key areas of strong performance		Five key areas of weak performance	
CAADP process completion	100%	Percentage of the population that is undernourished	32%
Inclusive institutionalised mechanisms for accountability	86%	Prevalence of underweight amongst children under 5 years old	24%
Public agricultural expenditure as a share of total public expenditure	16.8%	Increase of agricultural value added per agricultural worker	-5.4%
Percentage of farmers having access to agricultural advisory services	89%	Annual growth of the agriculture value added (agricultural GDP)	2.3%
Farm, pastoral and fisher households are resilient to climate and weather-related shocks	55%	Increase of the value of intra-Africa trade of agricultural commodities and services	-0.1%
Country progress score 2017 (out of 10): 5.35 (on track)			

The current Agricultural Growth Plan (AGP2) seeks to substantially increase agricultural productivity and commercial orientation of smallholder farmers, thus contributing to household food security. The AGP2 consists of five components: i) public agricultural support services; ii) agricultural research; iii) smallholder irrigation development; iv) agriculture marketing and value chains; and v) project management, capacity development and M&E.

ATA was established in 2010 as a delivery bureau that addresses systemic bottlenecks in the agricultural sector. It is mandated with three primary approaches: i) address systemic bottlenecks within the agricultural transformation agenda; ii) improve crop commodity value chains and geographies through ACC; and iii) strengthen livestock commodity value chains through the Livestock and Fisheries Sector Development Project (ATA, 2020).

The ACC initiative contains clearly defined geographic clusters specialising in priority commodities across the four major agricultural regions (Figure 1). The ACCs are intended to act as centres of excellence, where regions will be supported to maximise production and productivity while integrating commercialisation activities. Within the ACC, 30-200 farmers group together on adjacent land to farm as one. These groups are required to adopt the latest full-package farm recommendations, including use of improved seeds, fertiliser application, and other good agronomic practices (ATA, 2020).

Since its establishment, ATA has been responsible for four major projects to improve input supply. These are (ATA, 2020):

- Cooperative-based seed production: the objective was the transformation of the intermediate seed sector by creating 11 seed unions in the four main regions (Amhara, Oromia, SNPPR and Tigray);
- Direct Seed Marketing (DSM): the objective was to create an efficient seed supply system that ensures smallholder farmers' access to improved seeds through multiple channels (public and private), and thereby enhance their production and productivity;
- FSCs: the objective was to establish 20 commercial FSCs in the four main agricultural regions that function agricultural one-stop input supply and service centres;
- Agricultural one-stop shops: the objective is to scale up the FSCs by establishing 30 one-stop shops and 150 retail shops to enhance smallholder farmer access to agricultural inputs and advisory services.

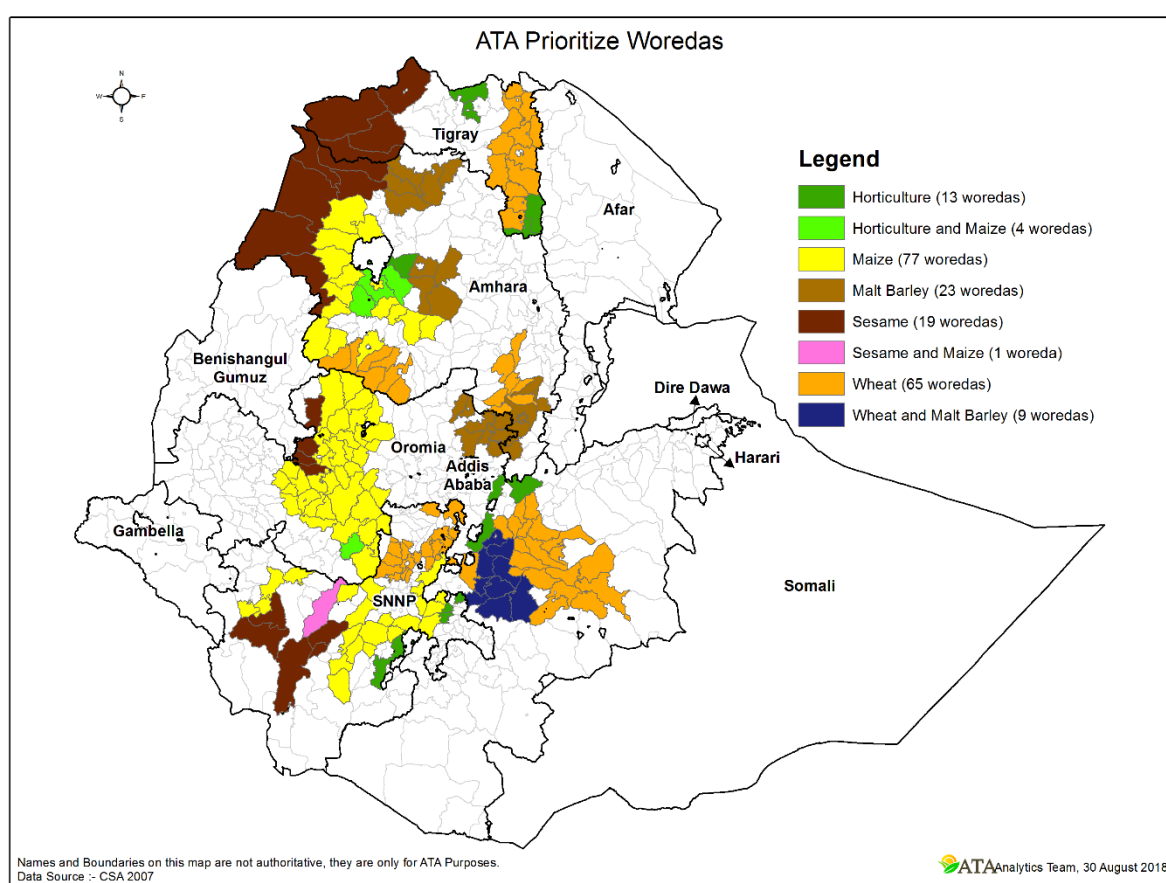


Figure 1: ATA prioritised woredas for ACCs

3.2 AGRA objectives and activities

AGRA aims to catalyse and sustain an inclusive agricultural transformation in Africa by increasing incomes and improving food security for 30 million farming households in 11 focus countries. Since 2006, AGRA and its partners have worked across Africa to deliver solutions to smallholder farmers and local African agriculture enterprises. AGRA has invested in the systems and tools for Africa's agriculture: high quality seeds, better soil health, access to markets and credit, coupled with stronger farmer organisations and agriculture policies. In Ethiopia, AGRA in particular seeks to contribute to inclusive agriculture transformation by: i) improving the incomes and food security of 2.8 million

smallholder households; and ii) modernising agriculture systems through increasing commercialisation and incomes of smallholders and support investments.

AGRA Ethiopia focus and activities, 2007-2016

During the period 2007-2016, AGRA implemented 10 projects in Ethiopia at a total value of US\$18.2 million. The bulk of these investments were in input systems development and policy and advocacy (AGRA, 2017).

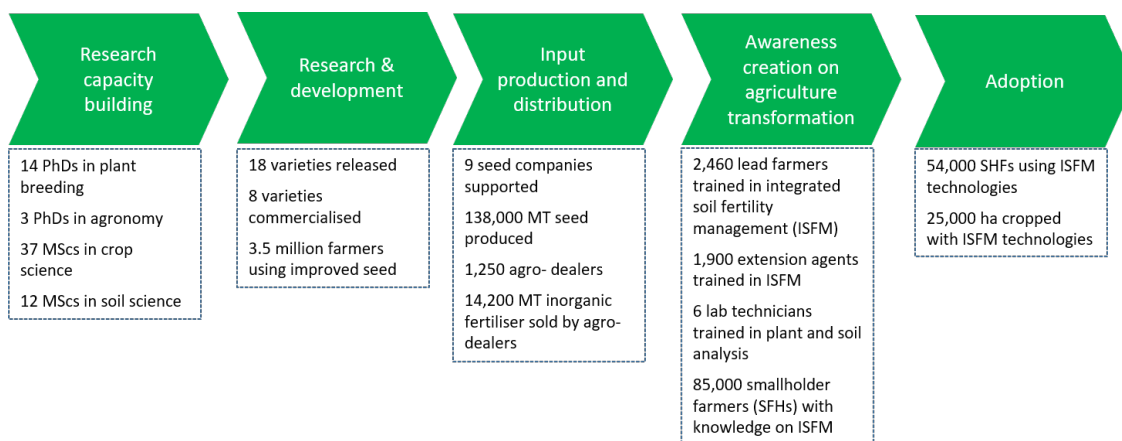


Figure 2: AGRA investments and results in Ethiopia over the period 2007-2016 (AGRA, 2016)

AGRA country strategy, 2017-2021

AGRA seeks to closely align its interventions to ATA's strategy, which plays a critical role in the agricultural transformation in Ethiopia. Specific interventions include (AGRA, 2018):

- Country support and policy engagement which entails support to GoE i) to implement the GTPII; ii) provide advisory services to MoANR; and iii) collaborate with the ATA in implementation of the ACC initiative; and iv) facilitate the creation of an enabling environment that attracts increased private sector investment
- Scaling up system and farmer level initiatives in the four target regions: Amhara, Oromia, SNNPR and Tigray;
 - Strengthening input supply systems and linkages to output markets in order to facilitate the uptake of yield-enhancing agricultural technologies
 - Enhancing input distribution and accessibility through electronic voucher systems
 - Expanded market access through value addition, structured trade, quality enhancement and aggregation
- GoE and the private sector will be AGRA's scaling and sustainability partners in Ethiopia.

FO = Farmer Organisation
ISFM = Integrated Soil Fertility Management

In context, AGRA's support for the Ethiopian agricultural sector is tiny. The budget of US\$15 million (for the period 2017-2021) is less than 1% of what is invested in the country's agricultural development. AGRA's strategic vision can thus only be achieved through strong partnerships with other important development partners in Ethiopia. In addition, AGRA's country support will be tailored to specific capacity needs of MoANR and the regional BoANRs (AGRA, 2017). The country team therefore tries to leverage the funds of bigger donors, working with what already exists and looking for entry points. AGRA participates in big donor platforms that convene donors and major actors to coordinate their activities. This includes the Rural Economic Development and Food Security working group, which is led by

the Minister of Agriculture, and brings members together to share their activities and lessons learned. Another major platform is the PIATA country advisory council, which includes donors such as the Bill & Melinda Gates Foundation (BMGF), the Department for International Development, Kreditanstalt für Wiederaufbau (KfW development bank), and the United States Agency for International Development (USAID).

It is worth noting that AGRA's current country office in Ethiopia only became fully operational in March 2019. Before, AGRA was hosted at ATA, but also operated from the headquarters in Nairobi. This means that the current country staff are still new in their current positions, however, they have significant experience in their field of work.

AGRA's support to smallholder farmers is channelled through consortium grants. An important assumption is that access to markets and finance provide the most effective way to scale the uptake of inputs by farmers once they have adopted productivity-enhancing technologies. The consortia aim to improve market-led production of the following priority crops: haricot beans, maize, sorghum, teff and wheat. AGRA funds two consortia projects, which are summarised in Table 2.

Table 2: AGRA-funded consortia projects in Ethiopia

Consortium	Improving Market-led Production of Selected Agricultural Commodities in Targeted Woredas of Amhara and Tigray Regions (IMPACT)	Promoting a market-based production system for smallholder farmers in SNNPR through strengthening market-led agricultural extension and creating appropriate input-output linkages
Consortium partners	Sasakawa Global 2000 (lead partner); Technoserve, Farm Radio International (FRI)	Oxfam (lead partner); Agri-Service Ethiopia (ASE), South Ethiopia Peoples' Development Association (SEPDA)
Regions	Tigray, Amhara	SNNPR
Starting date	January 2019	December 2018
Number of farmer beneficiaries	205,639	120,000 directly 200,000 indirectly
Grant (US\$)	?	1.3 million
Objectives	<ol style="list-style-type: none"> 1. Strengthened agricultural input systems and supply chain. 2. Increased adoption of target crops productivity enhancing technologies and practices. 3. Reduced post-harvest losses. 4. Strengthened target crop value chain for increased access to structured output markets. 5. Increased women empowerment and livelihoods in agriculture. 6. Increased youth empowerment and livelihoods in agriculture. 	<ol style="list-style-type: none"> 1. Increase productivity (+30%) of haricot beans, maize, sorghum, teff and wheat. 2. Strengthen and expand access to output markets for haricot beans, maize, sorghum, teff and wheat producers.

The consortia organise smallholder farmers around farmer learning platforms (FLPs) that consist of a mother demonstration with five baby demonstrations managed by farmers. The

mother demonstrations are managed by the development agent (DA) (extension officer), who manages five demonstration plots. The demonstration plots are used to demonstrate different crop varieties (e.g. high-yielding/drought-tolerant), different organic and/or mineral amendments, and line planting. The baby demonstrations are managed by model farmers on their own farms.

Ethiopia is characterised by a different institutional context than many other African countries, with an elaborate public extension system but weak local private sector (see section 3.1). AGRA's strategy in Ethiopia thus deviates from its strategy in other countries. Because of the limited SME development, AGRA Ethiopia does not provide grants directly to SMEs, which is different from AGRA's interventions in other countries. However, SMEs are indirect beneficiaries through the grants awarded to NGOs and public (research) institutes.

Table 3: AGRA approved grants (2017-2019)

System	Grantee	Grant	Value (US\$)
State capability and policy support	MoANR ATA	?	3.6M?
Markets	SG2000 – TechnoServe – FRI	Market-led production of priority crops	?
Inputs	Oxfam – ASE – SEPDA		1.3M
Inputs	BoANR/MoANR	Enhance input distribution and accessibility through electronic voucher systems;	?
Fertilisers	BoANR, multi-purpose cooperatives	Support fertiliser blending into viable businesses	?
Seed	EIAR	Support private seed companies to produce EGS and certified seed	?
Seed	BoANR/MoANR	Strengthen regional seed regulatory agency (SSCCP)	2.5M

4 Seed system

4.1 System performance

The performance of the seed sector in Ethiopia is below the desired level. According to the MoANR (2019), one of the major factors of the weak performance of the seed system is limited commitment – the lack of ownership to implement endorsed strategies and legal frameworks at all levels of government structures. Other limiting factors identified by MoANR (2019) include: lack of role differentiation, lack of accountability, limited capacity across institutions, and a less favourable business and investment environment.

Table 4: Timeline of key seed system changes and events in Ethiopia 2010 to present

	2010-11	2012-13	2014-15	2016-17	2018-19
Variety development	Varieties released: 2 teff, 3 sorghum, 5 maize, 11 wheat ^a	Varieties released: 0 teff, 3 sorghum, 9 maize, 12 wheat ^a	Varieties released: 2 teff, 3 sorghum, 9 maize, 11 wheat ^a	Varieties released: 5 teff, 3 sorghum, 11 wheat and 6 maize ^c	Varieties released: 5 teff, 4 sorghum, 6 wheat and 3 maize ^c
EGS production					
Seed multiplication	Establishment of regional seed enterprises. 2011 certified seed production: 62,617 MT ^b			2017 certified seed production: 68,525 MT ^b Strengthening of seed unions by ATA	2018 certified seed production: 88,110 MT ^b
Seed marketing and distribution	Introduction direct seed marketing	Start of MoANR pilot DSM			
Seed use					
Seed quality assurance		27 seed quality standards revised			
Seed policies and laws	Preliminary formal seed sector strategy developed	Law amendment: Seed Proclamation no. 782	National Seed Systems Strategy	Implementation seed regulation	
Seed system governance and partnerships	Establishment of the Ethiopian Seed Association	Start of ISSD programme (phase I)		Start of ISSD programme (phase II)	

^a Source: Mabaya et al., 2017

^b Source: Hassena & Borman, 2019

^c Source: Key informant MoANR, 2019

Ethiopia recognises formal, intermediate and informal (non-regulated) seed systems. The informal system is the major seed supplier; the formal system contributes less than 20% of

the seed used by farmers (MoANR, 2019). The intermediate sector consists of a community-based seed production system where the seed is not certified nor fully regulated, but the quality is considered to be higher than the seed produced by the informal sector (Mabaya et al., 2017). Figure 3 depicts the seed system in Ethiopia.

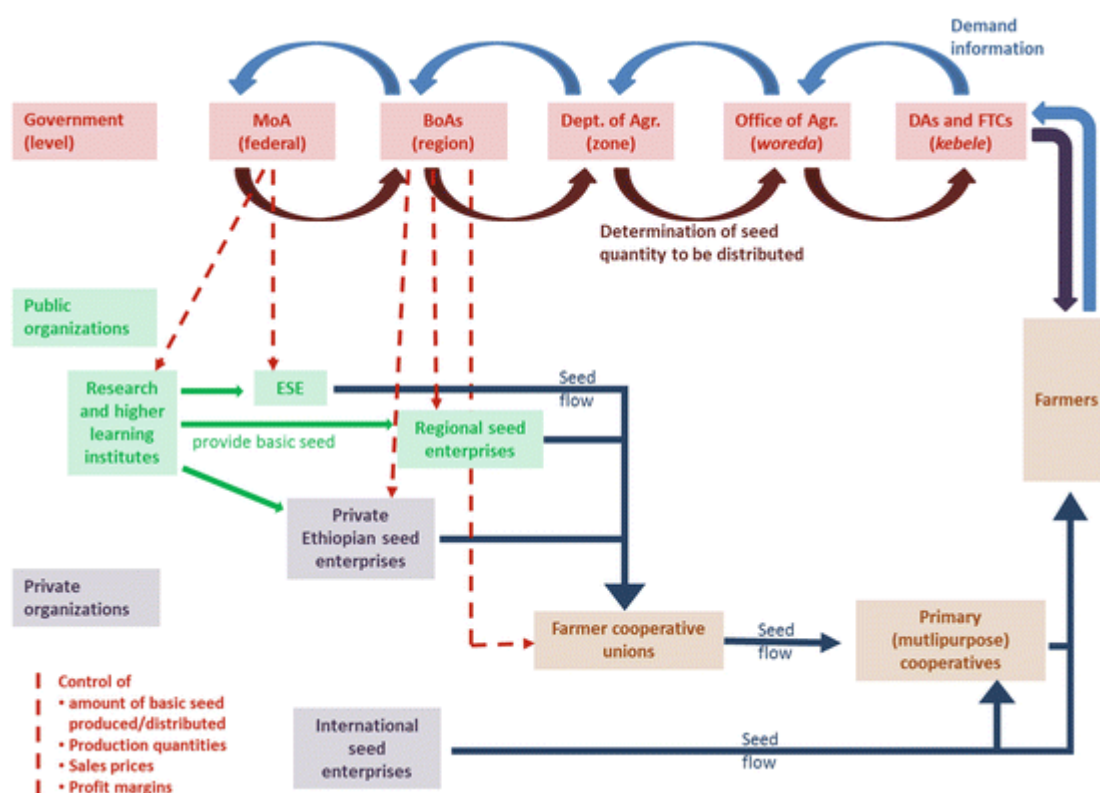


Figure 3: The seed system in Ethiopia

Source: Husmann, 2016

A number of major changes have been ongoing in the Ethiopian seed sector over the last decade. The first major development is a shift from a single national seed enterprise to a landscape with a national seed enterprise, regional seed enterprises and private seed enterprises, stimulating competition. The second important development is that of a system that allows for 'direct marketing' of seed, in which farmers get the opportunity to buy the seed of their choice from seed suppliers directly. This system is slowly being introduced in a growing number of *woredas*³ in Ethiopia. A third significant development is the emergence of farmer seed businesses, which are commercial seed production and marketing cooperatives that produce certified seed, either for direct marketing or through contracts for seed companies. A fourth development is the decentralisation of seed quality assurance services to regional level. Together, these developments bring new dynamics into the seed system, navigating it away from fully centrally planned production and distribution, to a system that responds better to client demand and to which competing seed entrepreneurs can profitably respond.

Although investments are being made across the different parts of the seed system, it is acknowledged that progress is slower than expected and many challenges remain. The seed system strategy serves as a road map of the sector. This strategy also identifies the areas for support so development partners can align their activities accordingly. However, MoANR

³ A *woreda* is similar to a district; it is an administrative unit one level higher than a *kebele* in Ethiopia

observes that development partners also come with their own priorities, which may not align with those of the government. Table 5 summarises the current strengths and weaknesses of the Ethiopian seed system.

Table 5: Current strengths and weaknesses of the Ethiopian seed system according to stakeholders and reviews

Seed chain function	Actors	Current strengths	Current weaknesses	Improvement
Variety development	<ul style="list-style-type: none"> • EIAR • Research institutes and universities • CGIAR • National Variety Release Committee • MoANR 	<ul style="list-style-type: none"> • Qualified plant breeders • Seed companies satisfied with adequacy • Availability of new varieties for different agro-ecological zones 	<ul style="list-style-type: none"> • Lack of plant breeder rights (lack of implementation of Plant Breeders Bill) • Inadequate breeding facilities due to low investment in improving modern breeding capacities ^{a,b} • Low commercialisation rate (10%) ^a • Duration of variety release: 46 months ^b 	<ul style="list-style-type: none"> • Implementation and enforcement of Plant Breeder Bill <p><i>Priority: medium (3)</i></p>
EGS production	<ul style="list-style-type: none"> • EIAR • Ethiopian Seed Enterprise (ESE) • Regional research institutes • Regional seed enterprises 	<ul style="list-style-type: none"> • Technical skills for EGS production 	<ul style="list-style-type: none"> • Limited availability of EGS for seed multiplication ^{a,b} • Lack of facilities (land, machinery, laboratories, labour) for EGS production ^b 	<ul style="list-style-type: none"> • Increase EGS production of research institutes and seed enterprises <p><i>Priority: very high (1)</i></p>
Seed multiplication	<ul style="list-style-type: none"> • ESE • Regional seed enterprises • Local seed companies • Seed cooperatives • Seed unions 	<ul style="list-style-type: none"> • Private seed company (DuPont Pioneer) produces hybrid maize seed efficiently and for the market • ESE and regional seed enterprises produce hybrid maize • Emerging local private companies produce hybrid maize 	<ul style="list-style-type: none"> • Limited capacity for seed production ^a • Lack of irrigation facilities and mechanisation • Lack of working capital (access to finance) • Lack of storage capacity at primary seed cooperatives • Poor incentive for DuPont Pioneer and its international competitors resulting from Forex export limitations 	<ul style="list-style-type: none"> • Strengthen capacities of seed producers (enterprises, unions, cooperatives) • Access to finance <p><i>Priority: high (2)</i></p>
Seed marketing and distribution	<ul style="list-style-type: none"> • Cooperatives • BoANR • MoANR • Input suppliers • Seed unions • Seed enterprises 	<ul style="list-style-type: none"> • Introduction of direct seed marketing to shorten supply chain 	<ul style="list-style-type: none"> • Lack of market-driven seed production system ^a • Only partial market liberalisation • Partial continuation of demand and supply planning, resulting in non-sold stocks at <i>woreda</i> level • Lack of information about seed supply and demand ^a • Weak promotion of new varieties ^a • Lack of vehicles for distribution • Lack of adequate storage at local level 	<ul style="list-style-type: none"> • Improve seed market information (supply and demand) • Access to finance <p><i>Priority: high (2)</i></p>

Seed chain function	Actors	Current strengths	Current weaknesses	Improvement
Seed use	<ul style="list-style-type: none"> • Farmers • Farmer Training Centres (FTCs) • Agro-dealers • Agricultural offices • Cooperatives 	<ul style="list-style-type: none"> • Farmers become increasingly aware of improved varieties because of promotion, extension and market demand 	<ul style="list-style-type: none"> • Limited commercialisation and promotion of newly released varieties ^a • Counterfeit seeds on markets • Mismatch supply and demand • Lack of choice for seed clients 	<ul style="list-style-type: none"> • Promotion of new varieties <p><i>Priority: high (2)</i></p>
Seed quality control	<ul style="list-style-type: none"> • Seed Inspection Unit 	<ul style="list-style-type: none"> • Seed Act • Each region has a seed inspection unit with trained inspectors • Plans to accredit private seed inspectors • Quality assurance provision on a shoestring, but functioning 	<ul style="list-style-type: none"> • Weak inspection/field supervision of seed production due to lack of resources ^a • No out-growing test done, making the system vulnerable to fraud after bagging 	<ul style="list-style-type: none"> • Increase human resource capacity for seed inspection • Provide necessary resources for field inspection (increase inspection fee) <p><i>Priority: medium (3)</i></p>
Seed policy and regulation	<ul style="list-style-type: none"> • MoANR 	<ul style="list-style-type: none"> • Enabling agricultural policy for the development of the agricultural sector • Major seed policy changes implemented and continuing, bring market dynamics and entrepreneurship into the sector 	<ul style="list-style-type: none"> • Lack of implementation of proclamation on plant variety protection because of government disinterest ^a 	<p><i>Priority: medium (3)</i></p>
Seed sector governance and collaboration	<ul style="list-style-type: none"> • ESA 	<ul style="list-style-type: none"> • National level and regional level stakeholder debate on seed sector reform 	<ul style="list-style-type: none"> • Lack of resources 	<p><i>Priority: low (4)</i></p>

^a Source: MoANR 2019

^b Source: Mabaya et al., 2017

Variety development

Variety development and release are primarily the role and responsibility of the public sector; more than 85% of the released varieties are publicly owned (MoANR, 2019). Plant breeding is the mandate of the Ethiopian Agricultural Research System (EARS), in particular, EIAR and the Regional Agricultural Research Institutes (RARIs) (Mabaya et al., 2017). EIAR is the major source of nationally registered varieties, while the RARIs release varieties with specific adaptations to the regional agro-ecological zones (Abebe et al., 2017). In 2017, there were 74 breeders working on the four focus crops (23 for maize, 20 for wheat, 16 for sorghum and 15 for teff), nearly all working in the public sector. On average, seed companies rated the adequacy of breeders as good, even though the output in terms of number of varieties released is considered relatively low (Mabaya et al., 2017). However, according to MoANR staff, more than 1,000 varieties are released per year, but very few varieties are actually commercialised. MoANR tried to retrieve information on variety release and

commercialisation from the research institutes, but it could not be provided. Lack of monitoring data is thus a problem.

When the research institutes release new varieties, they are also responsible for the demonstrations of these new varieties to public and private seed enterprises, extension services and BoANR/MoANR. The DAs of the public extension services are responsible for the promotion of new varieties to farmers. Key informants who were interviewed acknowledge that the link between research and extension is weak. Researchers demonstrate new varieties, but the extension services have the mandate to promote the varieties at scale to farmers. However, the DAs often lack the resources to do their work well.

It is estimated that only 10% of the released varieties are commercialised (mostly wheat and maize); the rates of varietal change and seed replacement are equally low (MoANR, 2019). Nevertheless, the average age of varieties sold in 2016 are relatively young compared to other countries: 4.8 years for wheat, 5.4 years for maize, 6 years for sorghum and 6.7 years for teff. The most popular varieties are BH661 for maize (released in 2011), Danda'a and Kakaba for wheat (both released in 2010), Quncho for teff (released in 2006), and Gubiye for sorghum (released in 2000). The oldest varieties on the market in 2016 were 10-11 years old (Mabaya et al., 2017). In 2019, key informants from the seed sector, as well as farmers, still referred to the varieties BH661 and Quncho as the most popular varieties.

Most improved varieties are developed for cereal crops. There is a general shortage of improved varieties for legumes. Vegetable seeds are imported from other countries. Most of the maize varieties (nine out of 12) released between 2014 and 2016 are climate smart (i.e. early maturity and/or tolerant to extreme weather conditions), but this is not the case for the other focus crops. Most wheat varieties are bred for rust resistance, which is a major problem (Mabaya et al., 2017). Some key informants reported that crops are affected by pests and diseases related to climate change – especially new varieties of wheat, which, after a few years, become severely affected by diseases, particularly wheat rust. Hence the continuous demand for new wheat varieties that are rust resistant.

Although the Plant Breeders' Rights Proclamation has been in action since 2006, seed producers use varieties developed by public research institutes without paying royalties or having exclusive use rights (MoANR, 2019). It is thought that the delay in implementation of the Proclamation restrains variety development by public research institutes and private seed enterprises. It is anticipated that the implementation of the Breeders' Rights Bill will incentivise variety development.

The National Variety Release Committee (NVRC) is responsible for the evaluation and release of varieties (MoANR, 2019). On average, it takes 46 months to release a variety in Ethiopia. The process is long due to delays in field evaluations and NVRC meetings caused by limitations in budgets, and staff of breeders and regulators (Mabaya et al., 2017). Key informants from MoANR and EIAR confirmed that the length of this process had not changed by 2019.

EGS production

Ethiopia distinguishes four different types of seed (Atilaw et al., 2017):

- breeder seed: first generation produced under the supervision of a plant breeder;

- pre-basic seed: progeny of breeder seed, used for crops with low multiplication factor;
- basic seed: progeny of pre-basic seed, used for certified seed production;
- certified seed: progeny of basic seed, sold to farmers.

The public research institutes are the main source of EGS as they own most varieties of grain crops, EIAR being the main EGS producer of public varieties. Parastatal seed enterprises also produce EGS, but smaller seed enterprises produce little EGS (MoANR, 2019) as they require a competence assurance certification from regional and federal regulatory bodies to produce EGS. There are a few private seed enterprises who have the licence to produce EGS, but they struggle to access breeder seed. The ESE, established in 1979 to produce and distribute improved seed, produces EGS on two specialised farms and its share in EGS production is considerable (Abebe et al., 2017).

The major challenge for many seed producers, in both private seed enterprises and the intermediate sector, is to get access to EGS. According to the African Seed Access Index (TASAI), seed companies scored their availability of EGS satisfaction as fair for four focus crops (maize, sorghum, teff, wheat). EGS production is not well aligned with the demand for (certified) seed, resulting in alternating shortage or excess supply of EGS (MoANR, 2019). In particular, the EGS production of pulse crops is far below the demand due to high seed rates and low multiplication factors (Abebe et al., 2017). Research institutes such as EIAR report that their production capacities are limited by land shortages – particularly for producing parental lines of hybrid maize, a lack of irrigation facilities and insufficient cold storage capacity. External factors, such as new crop pests and diseases and extreme weather events, also pose challenges to variety development and EGS production.

According to Abebe et al. (2017), the major challenges in EGS production are:

- limited demand for EGS of newly released varieties (due to limited incentives for seed producers to create demand and limited demonstrations);
- limited EGS production capacity (lack of land, facilities and skilled staff);
- limited access to EGS (limited EGS production by other actors and no provisions for exclusive rights);
- low quality of EGS due to a weak capacity of the regional quality control bodies;
- weak enforcement mechanisms;
- lack of incentives for EGS production.

Seed enterprises indicate that it is also difficult to acquire the breeder seed, chemicals, proper equipment and machinery required for seed production and processing, due to a lack of finance. This restrains EGS production by private seed enterprises. Seed cooperatives and unions also reported that in some years they cannot get the right EGS from research institutes to multiply seed. Different varieties and crops are in short supply in different regions. At times, seed producers also face shortages of agro-chemical inputs such as pesticides. One seed cooperative reported that one year they received poor quality EGS from the local university which failed inspection. They sold the produce as grain instead of seed at a lower price but there was no compensation, resulting in conflict.

Seed multiplication

Most seed production is done through the informal farmer sector (Mabaya et al., 2017). The formal seed sector is dominated by four parastatal seed enterprises: Amhara, Ethiopia, Oromia and South Seed Enterprises. Together, they produce 75% of the total volume of

certified seed of cereals, pulses and oil seeds (MoANR, 2019). Although the parastatals are supposed to produce seeds that are commercially less viable for private seed enterprises (e.g. self-pollinating varieties for wheat and teff, orphan crops), these parastatals tend to stifle competition and private sector investment in seed production (Mabaya et al., 2017). There are a limited number of private seed enterprises in Ethiopia; DuPont Pioneer is the only international private seed producer focussing exclusively on hybrid maize. Other private seed producers are small-scale enterprises (MoANR, 2019), but only a few are actually in operation. It is estimated that about 10% of the certified seed supply is covered by the private sector, predominantly by DuPont Pioneer (Mekonen et al., 2019).

Ethiopian private seed enterprises complain it is difficult to compete with the subsidised public enterprises. They would rather see that the public seed enterprises focus on orphan crops, pulses, open-pollinated variety (OPVs) etc. and the private seed enterprises on the profitable crops such as hybrid seed and cereals. Although 58 private seed enterprises have been registered with a licence, few have a thriving business in seed production. Despite the government's push to strengthen the private sector, the enabling environment is restraining progress. Existing institutional structures (based on socialist policies) are preventing healthy competition between parastatals and private enterprises, and provision of business support services, such as access to finance, is inadequate.

Many private seed enterprises lack working capital, equipment and infrastructure that are necessary for seed production. There is a general expectation that the seed sector can benefit from more private enterprises, but the pending Plant Breeders Rights is delaying the investments of other (international) seed enterprises such as SeedCo. An important additional disincentive for investments by international seed companies are the restrictions on Forex export.

The parastatal seed enterprises were established in the period 2007-2010. They multiply seed for the major crops in the four main agricultural regions, particularly cereals (barley, maize, rice, sorghum, teff and wheat) but also other crops (beans, chickpea, faba, haricot beans, sesame and soybean). Seed multiplication is mostly done by out-growers (state farms, commercial seed producers, farmer cooperatives), but most parastatal seed enterprises also have their own land for seed multiplication. The seed enterprises train the out-growers on seed multiplication, field inspection, harvesting and post-harvest handling for the different varieties. The parastatal seed enterprises also conduct quality control in the field and at seed collection. If the raw seed does not pass the quality criteria, the seed enterprise rejects the seed. The parastatal seed enterprises do the processing, cleaning, treatment and packaging of the seed.

In addition to the parastatal seed enterprises, seed unions make up part of the formal sector. They are well organised and have skilled manpower for seed production, marketing and management, and are formally licenced to produce seed. Seed unions often produce through primary seed cooperatives that are members of the seed union (Sisay et al., 2017). The seed unions in Tigray and SNNPR reported that they were established only three years ago with support of ATA. These unions supply EGS to the primary seed cooperatives, and purchase the raw seed back for cleaning, packaging and selling. The unions often also provide financial credit support, capacity building and mechanisation services (e.g. renting out of tractors) to seed cooperatives. The member cooperatives buy shares in the union, and the profits made on the seed processing and marketing are paid back to the cooperatives in dividends. Some unions also run FSCs. Various development partners and organisations

(e.g. Africa Rising, ATA, the German Development Agency (GIZ) and the University of Mekelle,) support the seed unions with capacity building. Most seed unions acquired processing equipment (e.g. seed cleaner with generator for cleaning harvested seed in the 2019/2020 season), and funding for building materials to construct processing sheds in 2018 with a grant from ATA (co-funding requirement was 35%-40% of the total cost by the union itself).

The seed unions purchase the raw seed and sell the cleaned seed at fixed prices; this is calculated based on the seed production costs, plus 15% profit margin for the seed producer and a 5% profit margin for the cooperative. After cleaning, the union adds the administrative costs and compares the cost price with the regional price for certified seed. The final price for the improved seed is discussed with BoANR, also taking into account affordability for farmers. This may result in a lowering of the price or a subsidy from the government. The majority of the seed (80%-95%) is sold to multi-purpose primary cooperatives.

Despite the diversity of seed producers, the formal sector is dominated by only a few public enterprises in particular for the cereal crops sorghum, teff and wheat. Public seed enterprises account for 70% of the total seed output for the main focus crops, whilst some private enterprises still have a small but significant share in the market for hybrid maize varieties (Mabaya et al., 2017).

The seed production capacity of Ethiopia's public and private seed enterprises is insufficient to meet seed demand (MoANR, 2019). Ethiopia therefore recognises an intermediate seed sector which consists of community-based seed production. An estimated 95% of the 285 seed producer cooperatives (SPCs) do not meet the regulatory requirements to become accredited institutions (ATA, 2020). Instead, the intermediate sector is semi-formalised and produces so-called quality-declared seed. The seed production system is largely traditional with little mechanisation.

The SPCs share features with both the formal and informal seed systems. They produce improved varieties (obtaining EGS from the public research institutes) and some seeds are passed through the formal quality assurance and certification processes. Some SPCs have contracts with large seed enterprises, however, the SPCs also produce seeds of local varieties that are not passed through the formal certification processes (Sisay et al., 2017).

Seed distribution and marketing

Seed distribution is predominantly organised through a centralised, government-controlled distribution channel (Husmann, 2016). DAs carry out assessments of seed demand at *kebele* level, which is aggregated upwards through the governmental administrative ladder to the regional BoANRs (Husmann, 2016). The aggregated demand is communicated by MoANR to the seed producers (public seed enterprises and seed multiplication unions). The produced seed is subsequently allocated to the different *woreda* offices of agriculture (MoANR, 2019) and distributed through multi-purpose primary cooperatives. This organised seed distribution and marketing system is built on the assumption that individual farmer seed demands can effectively be accumulated and responded to through a planned, organised supply, coordinated by the public support systems to the agricultural sector. The seed demand assessment and subsequent allocation and distribution of seed through this centralised system requires substantial public resources, both in finance and staff time (Mekonen et al., 2019). The result of the distribution system remains imperfect and is restricting the choice of farmers for seed varieties and brands.

Despite the attempts to make seed producers responsive to the demand, seed production is still largely supply-driven (MoANR, 2019). The centralised distribution system lacks market competition and there are no incentives for seed producers to supply seed with the traits and quality demanded by farmers (Mekonen et al., 2019). The information flow to estimate aggregated demand is not strong and the demand may change during the year depending on the seasonal weather forecast. In addition, production challenges (e.g. limited capacities) frequently result in a mismatch between supply and demand of seed for specific crop varieties. It is not uncommon to have a shortage of seed in one area and excess in another, depending on the produced seed varieties, distribution and shifts in local demands. The underlying issue is lack of information on seed demand and supply in the different areas. So-called carry-over seed can still be sold the next season if it is properly stored, but if not, it is sold as grain.

Since 2010, the government has gradually introduced DSM – a more market-oriented system (MoANR, 2019). Public and private seed enterprises have been authorised to carry out their own seed demand assessments and sell directly to farmers in order to promote competition and create multiple, last-mile seed marketing channels (ATA & IFPRI, 2019). Certified seed is sold directly by seed companies to farmers through private agents at *woreda* level, or primary cooperatives (Mabaya et al., 2017). The expectation is that DSM will shorten the seed supply chain and improve the traceability of seed and accountability of seed producers to farmers. Experiences so far have been variable across the different regions, but farmers indicated that the performance of DSM is better than the centralised distribution system (Mekonen et al., 2019). DSM thus results in shorter seed supply chains which should improve efficiency and better response to local seed demand. Seed producers indeed reported that a larger percentage of seed that is distributed through DSM is sold than if distributed through the central distribution channel. The seed producers are responsible to assess the local demand (often done through the DAs), and for the distribution (including transport) of the seed to local outlets. Unsold seed is returned to the seed producer.

Key informants reported a few challenges with the introduction of DSM:

- As seed prices are fixed, seed suppliers are reluctant to market seed in remote areas where transport costs exceed the profit margin on seed. In order to make sure that enterprises also sell seed in remote areas, a committee assigns different areas to different seed suppliers;
- Some key informants think that DSM provides opportunities for counterfeit seed to enter the market when seed traders mix seed with grain;
- The seed enterprises and unions run more financial risk as they are required to pay transport costs and to take back unsold seed.

Under the DSM, agro-dealers sell seed from seed enterprises and unions on commission (0.4 Ethiopian Birr (Br) per kg); seed that is not sold is returned to the seed producer so the agro-dealer does not run a risk. For the seed enterprises and unions, however, financial risk increases under DSM as they pay the transport costs and are obliged to buy back any unsold seed. This is not the case when the seed is sold through the centralised distribution channel. Farmers' demand for improved seeds is increasing, but agro-dealers face challenges with acquiring working capital to purchase seed stock.

When seeds and fertilisers are distributed through the central system, this can include varieties that are not preferred by farmers. With DSM, farmers buy the varieties they prefer; the seed producers are supposed to supply the preferred seed after having assessed the

demand. However, with DSM, farmers face challenges with payments as they need to provide the money for the seeds upfront. Through the central system, the farmers were able to acquire seed on a credit basis.

MoANR (2019) estimates that 40% of certified crop seed is allocated through the government-controlled distribution channel, whereas 60% is marketed directly by the producers through DSM.

Prices for certified seeds of public varieties produced by parastatal seed enterprises are determined by MoANR. Based on market assessments and recorded production costs of the seed enterprises, a board (including the parastatal seed enterprises, representatives of MoANR and research institutes) decides on the profit margin. This determines the seed price of public varieties; the private seed companies do not participate in this price setting process (MoANR, 2016). Although private seed companies can set their own prices, they are hesitant to deviate from the fixed prices for public varieties as they fear they may lose their market share. Only the private enterprises that produce their own hybrid maize seed set their own prices (Mekonen et al., 2019). They can do this as their market share is based on the quality of their hybrid maize seed, which is well-known and preferred amongst maize producers.

The private sector company Pioneer is the only company that develops its own hybrid maize varieties and imports maize seed into Ethiopia, which reportedly takes more than three months. No seed is currently exported from Ethiopia (Mabaya et al., 2017).

The parastatal and private seed enterprises are reluctant to produce seed of new varieties because demand is low due to a lack of farmer awareness. There is thus a tendency to produce seed of the well-known, popular varieties. There needs to be a sizeable demand for seed enterprises to produce seed against a (small) positive margin. If the market for a new variety (e.g. disease-resistant or high-yielding) is not assured, the enterprise will produce the seed at a financial loss.

Key informants mentioned the issue of timely seed supply. Because of delays in seed processing due to limited processing capacities, it is a challenge to get seed to markets on time. Another challenge is the lack of working capital for seed suppliers; this hinders the volumes of seed that can be stocked before it is sold to farmers at the beginning of the planting season. The seed unions also reported a mismatch of supply and demand for seed. For example, in 2018, there was a shortage in Tigray because of drought. However, seed became unaffordable because of the high prices, resulting in some seed not being sold.

Seed use

The majority of the seed used is supplied by the informal seed system: individual small-scale farmers who save or exchange seed at the local level. The main reasons for using the informal seed sector are (Sisay et al. 2017):

- Smallholder farmers request only small quantities of seed which the formal seed sector does not supply;
- Smallholder farmers live in remote areas that the formal sector does not reach;
- Smallholder farmers have limited financial resources to purchase (certified) seed in the market;
- Smallholder farmers have fluctuating and diversified seed demands but the formal sector does not offer the required wide range of crop varieties.

The low utilisation rate of certified seed is attributed to constraints related to both supply and demand, including non-availability and late supply, poor quality, pricing problems, limited farmer awareness, poor access to input credit, and shifting variety preferences due to changing weather conditions (Mekonen et al., 2019). Key informants reported that the research-extension linkage is weak, resulting in poor promotion of new varieties. Other reasons for low uptake among farmers can include lack of finance to buy inputs, land shortage (making farmers reluctant to try new technologies as they need every plot to be food secure) and low literacy level. Demonstrations are therefore considered important so farmers can first observe results in other fields.

Other key informants commented that the low utilisation rate is due to the limited availability and affordability of improved seed. The public seed sector is considered inefficient by some as it does not align variety development and seed production with farmers' needs.

Public extension services have the mandate to promote improved varieties among farmers. This is often done by DAs at the local FTCs. Of the 80,000 *kebeles* in Ethiopia, an estimated 40,000-50,000 have FTCs that are responsible for training farmers and promoting good agricultural practices and new technologies (including improved varieties). However, although the government pays the salaries of the DAs, the FTCs often lack finance for operational costs of trainings and demonstrations. Whilst the DAs are reportedly not always adequately informed about crop varieties, seed enterprises rate their satisfaction with the FTC services as fair (Mabaya et al., 2017).

Despite the limitations of the extension services, the utilisation rate of certified maize seed has been increasing over the years and is the highest for all cereal crops. Mekonen et al. (2019) estimated that 32% of maize producers used certified seed in the 2014/15 season. The utilisation rate for other cereals is much lower, fluctuating around 8% for wheat and 3% for teff. Less than 1% of farmers use certified seed for sorghum and barley (Mekonen et al., 2019). The relatively high demand for improved hybrid maize seed is explained by farmers' awareness of its high yields, with varieties 660 and 661 being particularly popular. Key informants estimated that by 2019, 40% of farmers were using hybrid maize seed. As a result, average maize yields are now estimated at 3.5 MT/ha, compared to 1.7 MT/ha 10-20 years ago.

Key informants reported that the demand for certified seed is higher than current supply. Farmers generally prefer improved varieties (for all crops) as they give higher yields. Equally, there is a demand for pest-resistant varieties, especially for legume crops. However, the main constraint for purchasing improved seed is reportedly the high price. For example, in 2019, local wheat seed cost Br18-20/kg compared to Br23.5/kg for certified wheat seed. Other certified seed (e.g. hybrid maize, teff) can cost Br30-32/kg. The price for local teff seed is Br24/kg compared to Br29-36/kg for improved varieties. The hybrid maize marketed by Pioneer Hi-Bred costs Br40-60/kg, but is popular nevertheless because of its high yields and good performance. Public hybrid maize varieties cost Br25-28/kg.

Seed quality control

A national seed quality assurance system was established in the early 2000s, but was later decentralised into the various regions. The regional seed laboratories have the mandate for seed quality control and certification. The seed enterprises rate the quality of seed regulations and enforcement as good, according to TASAI, (Mabaya et al., 2017). However, the quality assurance services of the regional laboratories are constrained by limited

infrastructure and testing facilities (MoANR, 2019). Five new laboratories were established with support of the Swedish international Development Agency, bringing the total number of seed laboratories to 13 in Ethiopia (Mabaya et al., 2017).

Recognising the importance of quality seed, GoE (regional states and federal government) invested US\$3.5 million in quality control services by upgrading seed labs, testing facilities and vehicles in the period 2013-2017. However, the workload of seed inspectors escalated due to a growing seed sector in the same time period. For example, the number of seed producers (private and public enterprises, unions and primary seed cooperatives) increased from 30 to 200. As a result, the seed production area more than doubled while the seed production volume increased ten-fold. But seed quality control and certification has become more important with Ethiopia signing regional seed market agreements, like the Common Market for Eastern and Southern Africa (COMESA) seed regulation, and is expected to have an ISTA-accredited laboratory (MoANR, 2018).

In 2016, there were 32 public seed inspectors in Ethiopia, which is low given the large size of Ethiopia and the wide distribution of seed producing regions. It is estimated that on average, one seed inspector should inspect 3,500 ha per year. For comparison, in Kenya the average is 400 ha per seed inspector (Mabaya et al., 2017). Although Ethiopia has the standards in place, key informants reported that the implementation of field inspection is weak due to a lack of capacity (staff and resources). Seed inspectors are required to inspect fields three times in a growing season, but they may not have a car to visit the field in the first place. The limited mobility of inspectors thus poses challenges for the field inspection (Hassena et al. 2020).

Lack of resources also puts pressure on seed labs' quality control and in the issuance of seed quality tags – used to certify seed quality – for the seed enterprises. The upside is that, considering the resource-stress they are operating under, the seed quality assurance services are functioning relatively well. This is an indication that the system would have the capacity to absorb and make effective use of additional resources if they become available.

Due to the combination of limited inspection capacities and rapidly increasing demands on domestic certification services, the seed certification system is unable to address 70% of self-pollinated crop field inspections, and to conduct hybrid field inspections according to the required technical procedures. Nevertheless, seed enterprises rated their satisfaction with the availability of seed inspection services as good (Mabaya et al., 2017). The seed unions and seed enterprises also have their own inspectors for internal quality control. These inspectors are trained agronomists and have certificates for seed inspection. The seed unions do their own seed quality control during land preparation, germination, growth and flowering, in addition to the official inspections. The majority (90%-95%) of the seed produced by seed unions passes the inspection tests and quality control, unless if there are diseases in the crop.

In the past, GoE would cover the seed inspection costs, but since 2015, seed producers have had to pay a fixed fee (set by MoANR) for field inspection, sampling and lab testing. The field inspection fee is set at Br30/ha for hybrid maize and Br20/ha for other crops. According to key informants, this fee is too low to cover the costs of inspection. There is an initiative to establish private seed inspectors to increase the human resource capacity for seed control, but the current low fees make it financially impossible to build a business based on seed inspection only.

Seed policy and regulation

There are policy and legal frameworks in terms of variety release, plant variety protection, seed production, certification, marketing, import and export, and sub-continental harmonisation. However, operationalisation of the existing legal frameworks is challenging (MoANR, 2019). The Ethiopia Seed Proclamation no. 782 (2013) is the main seed policy instrument and has been fully operational since 2016 (Mabaya et al., 2017). The Seed Proclamation 2013 provides guidelines around variety release and registration (under MoANR), internal quality control, and the relations between the federal MoANR and regional BoANRs (MoANR, 2016). The Proclamation also gives rights to any seed producers holding a certificate of competence to access breeder seed, pre-basic and basic seed of registered varieties (Abebe et al., 2017).

The Plant Breeders Right Proclamation 2006 grants the intellectual property rights of plant breeders or breeding institutions to protect their varieties, but also tasks them with the responsibility for variety maintenance and EGS production and supply. The protection can be enforced by licensing or a royalty collection system on seed use, thus providing an economic incentive for EGS production and supply (Abebe et al., 2017). However, to date, this proclamation has not been implemented due to a lack of capacity, and breeder rights therefore cannot be enforced. Key informants in the seed sector remain positive that the bill will be implemented soon, given the GoE's priority of transforming the agricultural sector.

Though Ethiopia has signed a regional agreement on COMESA seed trade regulations, it has not yet endorsed an implementation plan for seed trade harmonisation (MoANR, 2019). Nevertheless, the regulatory framework of the seed sector is being aligned with COMESA regulations. The Seed Proclamation was revised in 2018, submitted to the council of ministers, and obtained approval in the first quarter of 2020. The legal framework for the seed sector has been drafted, but not yet endorsed, resulting in delays in its implementation.

The Seed Proclamation is under the mandate of MoANR; seed certification is decentralised to regional governments. The regions thus have their own seed regulatory bodies, but are supported by the federal Government with training and directives. The federal and regional seed inspection units expressed the ambition to be authorised as separate agencies so they can make autonomous decisions on quality control, and can hire qualified experts and increase salaries to attract and retain qualified staff. In Tigray this is already the case. Hassena et al. (2020) also conclude that an independent (federal) regulatory authority would address some of the capacity problems present in the current regulatory bodies.

The regional governments are currently harmonising the seed regulations and control systems across the regional states. Regional government officials meet every six months to discuss the seed regulations and tackle problems together.

Seed sector governance and collaboration

Seed sector coordination is predominantly carried out through ad hoc teams such as the Seed Unit and National Seed Advisory Group, which was established in 2017. The National Seed Advisory Platform was also established in 2017 by professionals from different organisations. The two networks are neither legally nor structurally responsible nor accountable for coordination or leadership, and may thus cease to exist at any time (MoANR, 2019). Some key informants observed that integration of the seed sector stakeholders could be improved, with better coordination between research, extension

services, seed producers and financial service providers. The ISSD programme has been promoting improved stakeholder interaction and seed sector governance.

The ESA was established in 2006, becoming operational in 2008. The ESA has raised awareness on seed-related issues in Ethiopia, working closely with MoANR and ATA (Mabaya et al., 2017). ESA has 38 members: four public and 24 private seed enterprises. Most private seed enterprises produce maize seed, whereas public seed enterprises focus on other cereals. ESA seeks to strengthen the private sector and ensure it focuses on profitable crops (maize, vegetables), whilst pushing for the public sector to handle the orphan crops. Some members, however, consider the ESA as weak and are disappointed with the lack of progress made.

4.2 AGRA change ambitions

Between 2008-2018, AGRA provided support to the Ethiopian seed sector, in particular through grants to EIAR and the training of plant breeders (40 MSc and 10 PhD students). In addition, AGRA supported the Micro Reforms for African Agribusiness (MIRA) policy programme (2016-2018), which outlines the monitoring and implementation of seed policies and regulator reforms. AGRA also provided support to ESA, capacitating the association with facilities and staff.

Table 6 summarises AGRA's change ambitions for the period 2017-2021 regarding the seed system in Ethiopia

Table 6: AGRA's ambitions for Ethiopia's seed system (2017-2021)

Seed system component	Envisioned change	Scope and scale	Intervention budget	Implementing partners
Variety development	A system that develops and maintains varieties that meet smallholder farmers' needs	Support the MoANR technical team to conduct an evaluation, verification and adaptation trials of candidate varieties (target: 204 varieties)	Part of SSSCP (US\$2,559,228)	Lead: MoANR Partners: Amhara, SNNPR, Oromia regions seed regulatory bodies; Tigray region seed regulatory dept.
EGS production	Sustainable supply of EGS to public and private sector seed companies	EGS production for key staple crops to address food shortage in Ethiopia	US\$1,835,800	Lead: EIAR Partners: Oromia, Amhara and SNNPR seed enterprises, Avallo private seed company
Seed multiplication	Increased availability and access to genetically pure, vigorous and healthy seeds	Establish seed producing groups	Consortia grant	Consortia
		Crop technology package training to DAs and seed producing farmers	Consortia grant	Consortia
Seed marketing and distribution	Sustained demand on the use of high-yielding seed varieties	Organise farmers' field days	Consortia grant	Consortia
		Weekly radio broadcast	Consortia grant	Consortia/FRI

Seed system component	Envisioned change	Scope and scale	Intervention budget	Implementing partners
	Increased farmers access for reliable supply of a range of improved seed varieties of assured quality at an acceptable price	Automation of the input voucher system	US\$1,400,000	ATA
		Organise SMEs, agro-dealers	Consortia grant	Consortia
		Input supply linkage with FSCs and other input suppliers	Consortia grant	Consortia
Seed quality assurance	Transparent, efficient and enhanced seed inspection and certification process	Enhance inspection and certification capacity of seed regulatory bodies	Part of SSSCP (US\$2,559,228)	Lead: MoANR Partners: Amhara, SNNPR, Oromia regions seed regulatory bodies; Tigray region seed regulatory dept.
		Operationalise Information and Communications Technology (ICT)-assisted seed certification management and tagging system by MoA	Part of SSSCP (US\$2,559,228)	Lead: MoANR Partners: Amhara, SNNPR, Oromia regions seed regulatory bodies; Tigray region seed regulatory dept.
		Outsourcing field inspection service to private firms by MoA	Part of SSSCP (US\$2,559,228)	Lead: MoANR Partners: Amhara, SNNPR, Oromia regions seed regulatory bodies; Tigray region seed regulatory dept.
		Capacity building to seed regulatory authorities	Part of SSSCP (US\$2,559,228)	Lead: MoANR Partners: O Amhara, SNNPR, Oromia regions seed regulatory bodies; Tigray region seed regulatory dept.
Seed policies	Comprehensive set of directives and regulations to incentivise breeders and private seed sector to introduce superior varieties into the system	Develop and operationalise plant breeders' directives	US\$229,500	ATA

In March 2019, the SSSCP was established with the aim of addressing seed quality control problems in Ethiopia. The overall goal of the SSSCP (2019-2021) is to improve service efficiency capacity of 13 seed laboratories, four regional and one federal level certification authorities, and ensure quality approved seed is supplied to more than 1.5 million smallholder farmers. The lead grantee of SSSCP is MoANR; other grantees include the seed certification authorities in the regions Amhara, Oromia, SNNPR and Tigray.

The following SSSCP activities are being planned (some to be implemented by partners):

- harmonisation of field inspection and testing procedures across the country;
- operationalise ICT-assisted certification and field inspection tracking system;
- evaluate level of implementation of endorsed seed quality control (legal frameworks proclamation, regulation, directives) and quality standards;
- introduce and operationalise new quality testing protocols and improve precision of existing ones;
- introduce electronic tagging system;
- enhance logistic capacity of seed labs;
- out-source field inspection to private field inspectors;
- enhance technical capacity of seed labs;
- pilot strategic seed reserve system in four regions by building a 1,000 MT capacity storage facility for each.

Seed certification has been decentralised and each region has its own seed regulatory body. The federal government supports them with training and directives. Currently, the different regulatory bodies are working on the harmonisation of the regulations in the four regions, so they can operate from the same system. This will facilitate the release of varieties from one region to another.

SSSCP invests in seed inspection facilities – particularly in vehicles and in digital tracking systems for seed inspection. Starting in 2020, lessons will be derived from the automated inspection system currently in use in Zambia in order to develop a similar digital tracking system for field inspection in Ethiopia.

SSSCP also supports capacity strengthening of the seed inspectors. There is a high turnover of staff, so training on quality control and seed regulations is always needed. The police are also trained to facilitate collaboration for law enforcement. AGRA is planning to support the training and establishment of private seed inspectors.

Through its consortium projects, AGRA supports the linkage of farmers to commercial buyers (e.g. agri-food processors). These buyers often require specific crop varieties with a specified quality for their produce. If farmers want to produce for the market, they are required to grow the variety type that is demanded by the processor, which is often different from the local varieties. The projects are therefore demonstrating the relevance of different crop varieties, including those preferred by industry.

4.3 AGRA's system change results

According to key informants, AGRA is a minor player in the seed system compared to the government and ISSD who have more resources (finance and human capacity) at their disposal. AGRA is therefore focussing on niche interventions that can strengthen the seed system in some of the weaker parts. Other donors mostly focus on technology development and capacity building, whereas AGRA seeks to support EGS production and seed quality assurance which are current bottlenecks in the seed system, yet not addressed by the other donors. Most of the notable results reported below have been achieved prior to the PIATA programme.

Variety development

AGRA supported EIAR with the release of 15 varieties prior to 2018 (three faba bean varieties, two soybean, two maize, one teff and one sorghum variety), but EIAR could not confirm how many varieties have been commercialised. Of the 15 varieties developed, four had distinct resilience traits to specific climatic stresses (Table 7). The average length of variety release is 46 months (Mabale et al., 2017).

Table 7: Number of target seed varieties with distinct resilience traits commercialised with AGRA's support for specific situations of stress or shock (AGRA Performance Indicator 8)

Year	Stress tolerant varieties	Source
2014	Variety: Faba bean: Dida'a Stress tolerance: water logging and black root rot resistance	KII (key information interview)
2015	Variety: Faba bean: Ashebeka Stress tolerance: water logging and black root rot resistance	KII
2015	Variety: Soybean: Gezella Stress tolerance: moisture stress	KII
2015	Variety: Sorghum: ESH3 Stress tolerance: moisture stress	KII

Table 8: Average length of time from seed variety release to commercialisation (AGRA Performance Indicator 7)

Year	Average length of time for variety release	Source
2016	46 months	Mabale et al., 2017
2019	No change	

Under the current SSCCP project, AGRA supports the technical team of MoANR to conduct an evaluation, verification and adaptation trials of candidate varieties. The target is to release 204 varieties (that is, 210,500 MT seed) over three years; in 2019, 66 varieties (68,000 MT seed) have been tested.

EGS production

AGRA's current support is mostly focused on EGS production for cereal (maize, teff and wheat) and pulse crops (common bean, faba bean and soybean). EIAR is the major grantee, and works with one private (Avallo Plc) and three public (Amara, Oromia and South) seed enterprises. The project started in August 2018 and aims to produce 196 MT of breeder seed and 1,310 MT of foundation seed (EGS) in three years. In addition, 6,000 farmers are expected to participate in field demonstrations of improved varieties. The project will also renovate infrastructure (e.g. five irrigation facilities, four cold rooms) of the public research institutes to increase their EGS production capacity.

In 2019, a total of 32 MT breeder seed, 214 MT of pre-basic seed and 403 MT basic seed (EGS) were produced. Over 3,000 farmers had participated in demonstrations of the improved varieties (for maize in particular). So far, the project outputs are on track, despite the fact that excessive rainfall and fall armyworm pose challenges to seed production. However, the effects further down the seed supply chain level have not been monitored. The project has identified that there is need for aggressive extension services to encourage uptake of the new varieties among farmers, and assessments on farmers' varietal and seed demands also need to be carried out. These learnings imply that there is still a mismatch between supply and demand for improved seed varieties.

Seed multiplication

When the seed unions were established in 2017, they were initially supported by ATA, ISSD and the International Institute for Tropical Agriculture, but this support has been declining. AGRA's support through consortium projects is expected to strengthen the seed unions further. The seed union in Tigray reported that the IMPACT consortium in Tigray (funded by AGRA) provides advance payments to increase the union's working capital at the beginning of the season, which is then to be repaid with seed after harvest. In addition, three SPCs reportedly received grants and technical training to support their seed production. The technical demonstrations of new varieties (as part of the consortium projects) was also considered important.

Seed marketing and distribution

No data was available on the quantity of improved seeds sold as a result of AGRA's support. This is likely to be negligible as seed production and sales is mostly supported by other donors, in particular, ATA.

Seed use

AGRA promotes the use of improved seed (in combination with good agricultural practices) through demonstration plots. Consortia of NGOs collaborate with *woreda* offices and FTCs to demonstrate these technologies at mother demonstrations at the FTCs (managed by the DAs). In addition, model farmers manage on-farm (baby) demonstration plots where they demonstrate the practices to fellow farmers; one model farmer has 10 followers. Key informants reported that they expect positive effects from these demonstration plots, but so far, only one season has been implemented.

Seed quality control

AGRA supports the federal and regional seed regulatory bodies. The support for acquiring vehicles (six for MoANR and two for EIAR) is considered important as other donors do not provide this type of support. However, MoANR procurement procedures are slow and the vehicles and lab instruments are yet to arrive where needed. In addition, AGRA has funded training for technical staff and provided *per diem* grants (Br94,000) for field inspectors.

Seed policy and regulation

AGRA is working with ATA and MoANR in developing a breeders' rights directive for the implementation of the breeder rights bill.

Seed sector governance and collaboration

AGRA organises a national seed linkage platform that brings together public and private seed companies, EGS producers (EIAR) and the consortia.

4.4 Analysis of AGRA results

AGRA's position in the intervention landscape

AGRA is a relatively small donor in the seed sector compared to ISSD and ATA. There are several programmes where the different organisations (ISSD, GIZ, ATA, CGIAR, and AGRA) collaborate on technical or policy issues, such as the digitalisation of the seed sector or the plant breeders' rights bill. AGRA takes a catalytic approach, trying to address the weak

linkages in the system, and supports the growth of the formal seed sector through the promotion of improved varieties and EGS production.

The major development partners in the seed sector are:

- ISSD Ethiopia: policy reform, capacitating regional governments, and promoting local seed businesses
- ATA: seed sector development
- The Food and Agriculture Organisation of United Nations (FAO) (limited support)
- USAID (limited support)
- International Center for Agricultural Research in the Dry Areas (ICARDA)/the International Maize and Wheat Improvement Center: variety development, maize and wheat research. ICARDA also supports policy development
- International Potato Center: variety development, local seed production

MoANR indicated that the (financial) support of development partners is relatively small. Each partner has its own focus and therefore there is no overlap in their support to the federal and regional governments. ISSD is focussing on the capacity building of regional governments, policy reform, the development of local seed businesses and DSM. AGRA supports seed quality assurance. For the wider seed system, ISSD provides support across value chains, whereas AGRA focuses on specific commodities. The support of AGRA is considered relatively small, which does not give it much clout to trigger major sector transformation and reform. However, AGRA is operating in the specific niche of quality assurance, and is unique as it does provide direct financial support to MoANR. Importantly, AGRA makes a clear link between its efforts in seed sector development, and agricultural transformation by smallholder farmers through intensification of their production.

Key informants reported that distinctive characteristics of AGRA, compared to other grantees (e.g. BMGF), are:

- AGRA acts more as an implementing partner than a distant donor. AGRA is engaged in the activities, for example, assigning consultants to projects to provide technical support;
- AGRA organises experience sharing and learning between grantees in order to build their capacities;
- AGRA focuses on technology promotion (demonstration plots with different varieties so farmers can observe performance) which is unique; other donors do not do this;
- AGRA is the only development partner supporting EGS production. This is identified in this study as a key bottleneck for the production of certified seed.

Relevance

The hands-on approach of AGRA creates trust and is appreciated by the key informants. MoANR indicated that AGRA's support (e.g. to SSCCP) is very relevant, but insufficient to bring about system change. It would prefer to see AGRA's support extended to the government's priority areas as outlined in the seed sector strategy. From a systems change perspective, a recommendation issued by Hasena et al. (2020) and confirmed here, is for Ethiopia to establish an independent federal regulatory authority. Other than issues with adequate and timely EGS production, many gaps relate to the inability of the regional quality assurance services to provide adequate and efficient services to seed companies, seed producers and farmers. Providing these services effectively can enhance the availability of quality seed of superior varieties, which in turn leads to higher agricultural productivity and income for farmers. The regional quality assurance services that exist operate relatively well considering the limited resources and human capacity they have, but would benefit

tremendously from intelligent support through the AGRA PIATA programme. This is a well-chosen area in which AGRA funds can contribute to systemic change in the seed sector.

Expected impact

The current impact of AGRA is considered limited by the key informants. Many commented that AGRA could and should do more, as there are still many areas in the seed sector to be strengthened. However, the very limited AGRA funds are creatively leveraged to deliver sustainable and long-term change, rather than support ephemeral project implementation. Suggestions would be to focus on governance and regulatory level processes in the seed sector, although pragmatic investments can also be made in other areas, such as supporting ISTA-accreditation of seed laboratories. Various grantees complained though that funds were released late, negatively affecting impact. These delays are the result of late payments of AGRA as well as bureaucratic internal procurement procedures within the grantees' organisations.

Sustainability

As most interventions started effectively in 2019, it is too early to give any indication of the sustainability of AGRA's current support to the seed system. The SSCCP is likely to produce long-term impacts by improving the implementation of policies and regulation. However, it is unlikely that support for EIAR for EGS production will produce systemic change in the long term. The same can be said on the long-term impact of the consortium projects on seed use, as it is not clear how the promotion of new varieties will be sustained after the project's lifetime.

5 Input system

5.1 System performance

The input system in Ethiopia, for fertilisers in particular, is predominantly organised by the federal and regional governments (see Figure 4), resulting in an implicit monopoly at each stage of the fertiliser supply chain in Ethiopia. According to Agbahey et al. (2015), the marketing margins are small and there is no evidence of abuse of the monopoly position or corruption by the fertiliser chain operators as the prices are controlled by GoE. This system, however, is not able to supply sufficient inputs and services to meet smallholder farmers' demands. Yet, the financial and bureaucratic barriers are considered too high for the private sector to enter the input system (Tesafa, 2018).

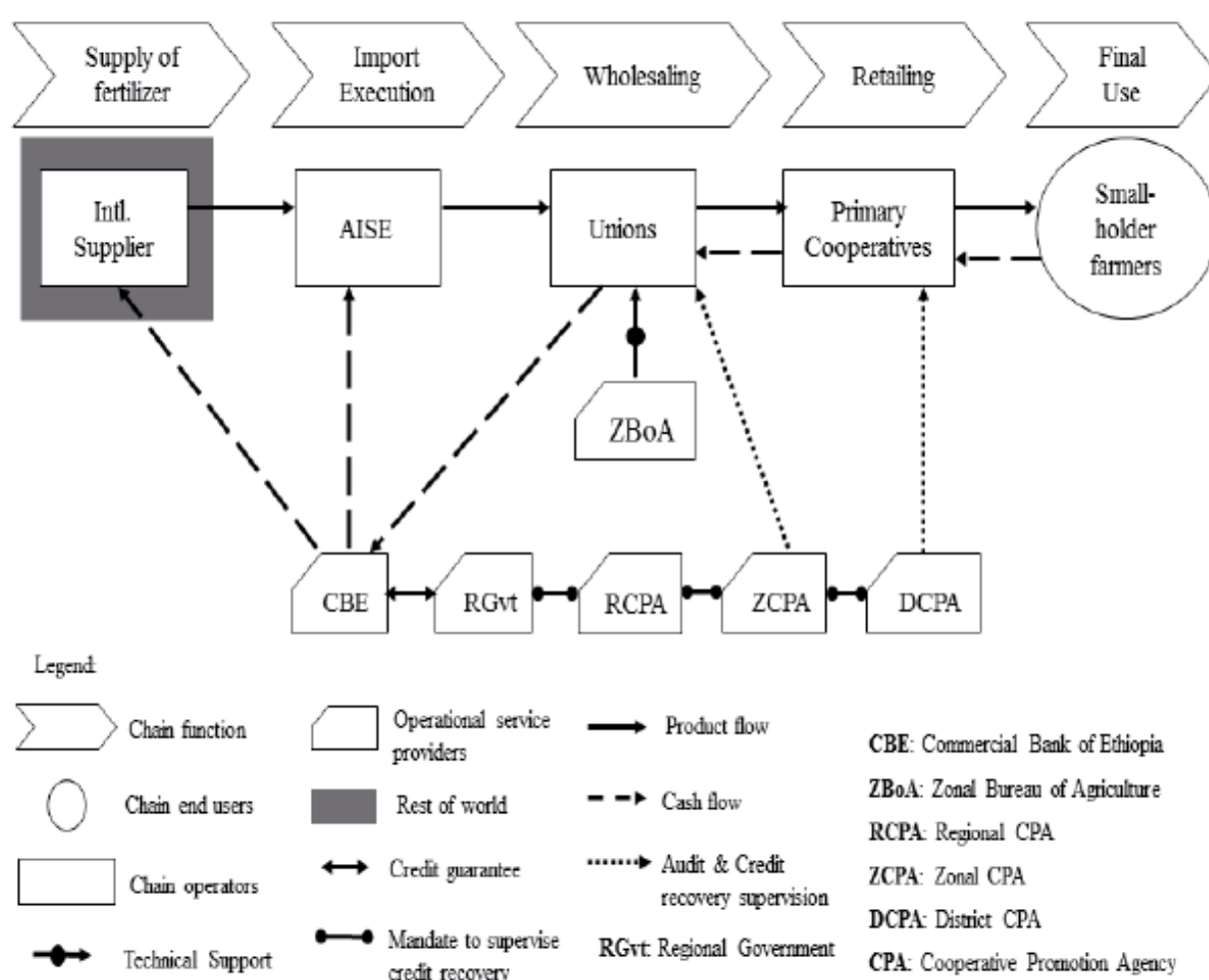


Figure 4: Fertiliser supply chain in Ethiopia.

Source: Agbahey et al., 2015

Importation of inputs

Ethiopia imports all fertilisers that are used for agricultural production. In 2008, the Ethiopian federal government decided to coordinate all fertiliser import through one company to benefit from economies of scale (Agbahey et al., 2015). The parastatal Agricultural Inputs Supply Enterprise (AISE) is currently the sole importer. AISE bases its annual forecasts for fertiliser

demand on the demand assessments at *kebele* level by the DAs, aggregated to *woreda*, zonal, regional and national levels (similar to the procedure for the assessment of national seed demand). This process is coordinated by the Input Supply and Marketing Directorate of MoANR. However, this demand assessment does not consider changes in conditions during the planting season, which may result in different crop choices and thus input requirements (IFDC, 2015). Furthermore, the estimates are often inaccurate as they are heavily influenced by individual arbitrary assumptions at the various governmental administrative levels, resulting in a mismatch between supply and demand of fertilisers (Agbahey et al., 2015).

Nitrogen and phosphate are the main nutrients to be imported (see Figure 5) – much more so than potash (K_2O).

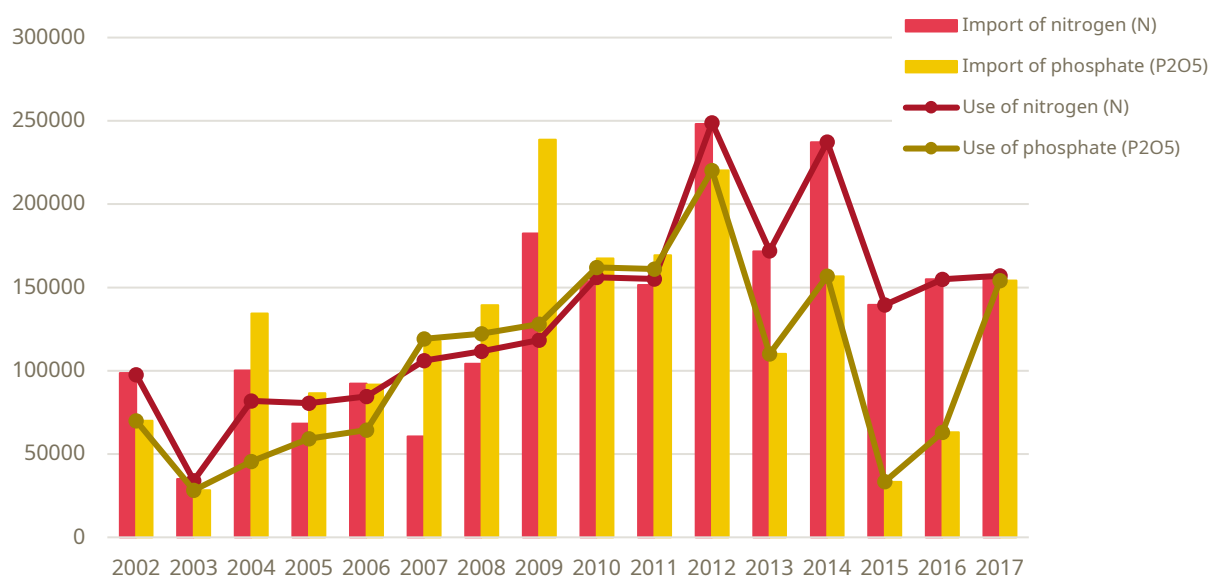


Figure 5: Total import and use of fertiliser nutrients in Ethiopia, 2002-2017
Source: FAOSTAT, 2020

Import volumes of fertiliser products vary strongly from year to year, depending on the availability of forex and fertilisers at the world market, but the most important types of fertilisers are urea, mono-ammonium phosphate (MAP) and di-ammonium phosphate (DAP) and NPK fertilisers (Table 9). Other fertiliser types are imported in small quantities (FAOSTAT, 2020).

Table 9: National import volumes of fertiliser products in Ethiopia

Fertiliser product	Import volumes	Four year aggregated volumes				Annual import 2017
		2002-2005	2006-2009	2010-2013	2014-2017	
Ammonia (anhydrous)	Import quantity (tonnes)	363	939	1748	153	9
	Import value (US\$1,000)	279	320	1873	661	44
Ammonium nitrate	Import quantity (tonnes)	592	1,305	11,999	15,142	5,852
	Import value (US\$1,000)	368	842	12,930	13,950	2,314

Fertiliser product	Import volumes	Four year aggregated volumes				Annual import 2017
		2002-2005	2006-2009	2010-2013	2014-2017	
Ammonium sulphate	Import quantity (tonnes)	967	9,221	1,296	2,900	361
	Import value (US\$1,000)	290	3,578	984	2,978	79
Calcium ammonium nitrate	Import quantity (tonnes)	13	2,617	7,873	2,305	441
	Import value (US\$1,000)	9	1,702	3,835	1,038	101
NPK fertilisers	Import quantity (tonnes)	3,494	3,116	1,485	56,008	54,859
	Import value (US\$1,000)	1,448	2,555	2,190	20,112	17,427
Urea	Import quantity (tonnes)	460,989	562,740	898,627	954,418	483
	Import value (US\$1,000)	105,900	218,909	462,217	418,144	182
Urea and ammonium nitrate	Import quantity (tonnes)	0	16,640	623	60	0
	Import value (US\$1,000)	0	5,702	518	117	0
Other nitrogenous fertilisers n.e.c.	Import quantity (tonnes)	19,299	5,120	4,104	13,901	1,655
	Import value (US\$1,000)	5,822	6,111	7,364	13,864	584
Other NP compounds	Import quantity (tonnes)	107,960	58,245	393,518	731,717	729,669
	Import value (US\$1,000)	36,657	19,530	243,225	233,691	231,482
DAP	Import quantity (tonnes)	8,335	447,263	1,220,869	384,548	1
	Import value (US\$1,000)	8,507	255,419	704,470.5	203,820	4
MAP	Import quantity (tonnes)	539,779	710,875	50,233	144,840	116
	Import value (US\$1,000)	158,297	325,216	30,870	76,757	86
Phosphate rock	Import quantity (tonnes)	86	155	960	724	0
	Import value (US\$1,000)	61	29	754	614	0
Superphosphate above 35%	Import quantity (tonnes)	42	26	518	30	0
	Import value (US\$1,000)	24	37	223	17	0
PK compounds	Import quantity (tonnes)	150	357	205	1,276	7
	Import value (US\$1,000)	129	180	328	2,231	16
Other phosphatic fertilisers n.e.c.	Import quantity (tonnes)	23,826	114	608	131	8
	Import value (US\$1,000)	6,808	108	546	293	19
Potassium chloride	Import quantity (tonnes)	63	418	515	648	170
	Import value (US\$1,000)	46	293	738	1,052	51
Potassium nitrate	Import quantity (tonnes)	129	875	1,040	4,024	835
	Import value (US\$1,000)	99	957	1,109	5,861	639
Potassium sulphate	Import quantity (tonnes)	236	876	306	2,290	195

Fertiliser product	Import volumes	Four year aggregated volumes				Annual import 2017
		2002-2005	2006-2009	2010-2013	2014-2017	
	Import value (US\$1,000)	124	409	348	3,671	186
Other potassic fertilisers n.e.c.	Import quantity (tonnes)	371	2,946	2,871	2,752	1
	Import value (US\$1,000)	217	3,173	3,447	6,620	6
Sodium nitrate	Import quantity (tonnes)	76	272	124	179	0
	Import value (US\$1,000)	48	136	132	365	0
Fertilisers n.e.c.	Import quantity (tonnes)	1,752	15,074	109,062	1,135,563	228
	Import value (US\$1,000)	995	23,263	75,575	6,977,778	216

Source: FAOSTAT, 2020

Local production, processing, repackaging

The local capacity for production, processing and repackaging of fertilisers is very limited. International fertiliser is packaged into 50 kg bags in the port of Djibouti before it is transported to Ethiopia on trucks. AISE is responsible for transport from the port to the central warehouses of the cooperative unions (Agbahey et al., 2015).

Ethiopia's fertiliser market deals with high transaction costs in the marketing and distribution of fertilisers because of the high transport costs from Djibouti port to a highly dispersed farmer population. High price volatility on the international fertiliser market also results in high fertiliser prices in Ethiopia (Agbahey et al., 2015; IFDC, 2012).

Menagesha Biotech Industry PLC (MBI), established in 2012, is a local, privately-owned enterprise in Addis Ababa that produces rhizobia-based bio-fertilisers for legume crops. The company has increased its production of fertiliser inoculants over time, based on demand. The maximum production capacity is 300,000 bags per year in its current facility, sufficient to fertilise 75,000 ha of leguminous crops (there are 5 million ha planted with leguminous crops in the country). The bio-fertiliser boosts yields of leguminous crops by two- or three-fold due to nitrogen-fixing rhizobia that are grown for crops on degraded land, or for crop varieties that are new to an area. If farmers apply organic matter, there is no need to apply the bio-fertilisers every year. One bag costs Br45 and is sufficient for 0.25 ha. For the same area of land, one needs to apply 25 kg urea costing Br450.

Despite the benefits to farmers and relatively low price, the enterprise does not manage to sell all its bags of bio-fertilisers because of marketing and distribution challenges. The enterprise only recently started to sell through agro-dealers, giving them a 12% commission. However, as agro-dealers and farmers are used to only selling and buying inputs that are distributed by the government and farmer cooperatives, there is a slow uptake of these bio-fertilisers that are promoted by a private enterprise rather than the government. In 2019, a new factory was established in Amhara region to also produce bio-fertilisers but its production has been very low so far due to limited capacities.

ATA supported the establishment of fertiliser blending plants (managed by cooperative unions) and fertiliser manufacturing factories in 2015 (Agbahey et al., 2015). Five farmer cooperative unions were appointed to produce blended fertilisers (each having a blending

factory with an annual capacity to produce 50,000 MT) to produce appropriate fertiliser packages (ATA, 2019). The fertiliser blending factories were out of production between 2016 and 2018 as imported fertilisers reportedly did not meet the standards required (i.e. different granular sizes) and the equipment was damaged subsequently. The OCP Group enterprise from Morocco was contracted (15-year lease agreement) by GoE in 2018 to revamp and restart the fertiliser blending facilities (Endeshaw, 2018).

Input wholesale

The multi-purpose cooperative unions function as the input wholesalers; they store the imported inputs in their central warehouses and organise transport to the multi-purpose primary cooperatives with support of the regional BoANRs, according to the quotas of supply. AISE supplies the fertiliser directly to the large-scale commercial and state-owned farms (Agbahey et al., 2015).

While the centralised procurement system through AISE is considered useful to take advantage of economies of scale, there is a lack of competition within the fertiliser supply chain in Ethiopia (Simtowe, 2015). Though there has been some private sector involvement in the import, wholesale and retail of fertilisers in the past, it is very limited at present. One of the major bottlenecks is the bureaucratic and financial requirements needed for the import process, which is more stringent for private enterprises than for AISE and the cooperative unions (Tesafo, 2018).

Input retail

The engagement of the private sector in input wholesale and retail has been limited over the years. Since 2005, the cooperative unions have taken up an increasing role in wholesaling and retailing of inputs such as fertilisers and improved seeds (Tesafo, 2018). Multi-purpose primary cooperatives are the main distributors of agricultural inputs on behalf of the cooperative unions (Tefera et al., 2017). The quantity of fertilisers to be distributed to *woredas* is pre-determined according to a plan aggregated from *woreda* to federal level. Farmers can purchase fertiliser from nearby cooperatives on a cash basis (IFDC, 2015).

ATA has introduced commercial Farmer Service Centres (FSC) as one-stop input supply and service centres in the four main regions (Amhara, Oromia, SNNPR and Tigray). FSCs provide agricultural inputs (seeds from private and public seed producers, fertilisers, pesticides) as well as veterinary medicines and services. Some also rent out small farm equipment. FSCs sell to farmers directly, but also to smaller retailers at *kebele* level, the so-called last-mile input suppliers. ATA has established 30-40 FSCs, and wants to increase the number to 200 outlets (number of FSC and retail shops combined). ATA provides agribusiness training and on how to acquire funding for office equipment, and pays for the first 15 months' salary for technical staff (manager, agronomist and vet). After the initial 15 months, FSCs are expected to pay the salaries themselves. This does not always happen, or salaries decrease, and qualified staff subsequently leave the FSCs.

DAs inform the FSCs on farmer demand for particular inputs. They also receive information from producers and importers on newly available seeds and agro-chemical inputs. FSCs provide more information on the application of agro-chemical inputs to farmers than private input suppliers, and the prices are deemed fair. FSCs reported several challenges, including: existence of uncertified suppliers who distort trade; scarcity of agro-chemicals resulting in unavailability or high prices; fluctuating seed availability; and difficulty in accessing working capital. In general, the demand for agro-chemical inputs is higher than the available supply.

Input suppliers reported that there is always demand for agro-chemical inputs and improved seed, but the challenge is working capital. Inputs, and in particular seed, are bought within a short period of time, but the input supplier needs to stock the supplies beforehand. Capital shortage limits the volumes at which inputs can be stocked in advance. Purchasing agro-chemical inputs from wholesalers (importers in Addis Ababa) is generally not a problem as long as the input suppliers can pay in cash; however, occasionally shortages do occur. Private agro-dealers do not sell inputs on credit, as there is no guarantee that the farmers will repay the loan.

Input use

Ethiopian soils are considered as having the highest rates of nutrient depletion in sub-Saharan Africa, while the use of fertiliser and improved seeds are limited (IFDC, 2012). Soil degradation is a widespread problem, but according to one soil expert many soils are also locking phosphorus so it becomes unavailable to crops. Smallholder farmers in Ethiopia use lower fertiliser rates than their counterparts in other countries despite government efforts to encourage the adoption of improved agricultural practices and inputs (IFDC, 2015). One key informant estimated that farmers use less than 10% of what is required, as the availability of fertilisers is limited (due to forex problems) and prices are high. IFDC (2012) estimated that Ethiopia must double its consumption of fertilisers to 1.2 million MT to achieve an agricultural growth of 6% per year. Figure 6 shows the trend of fertiliser use (nitrogen and phosphate) over the period 2002-2017.

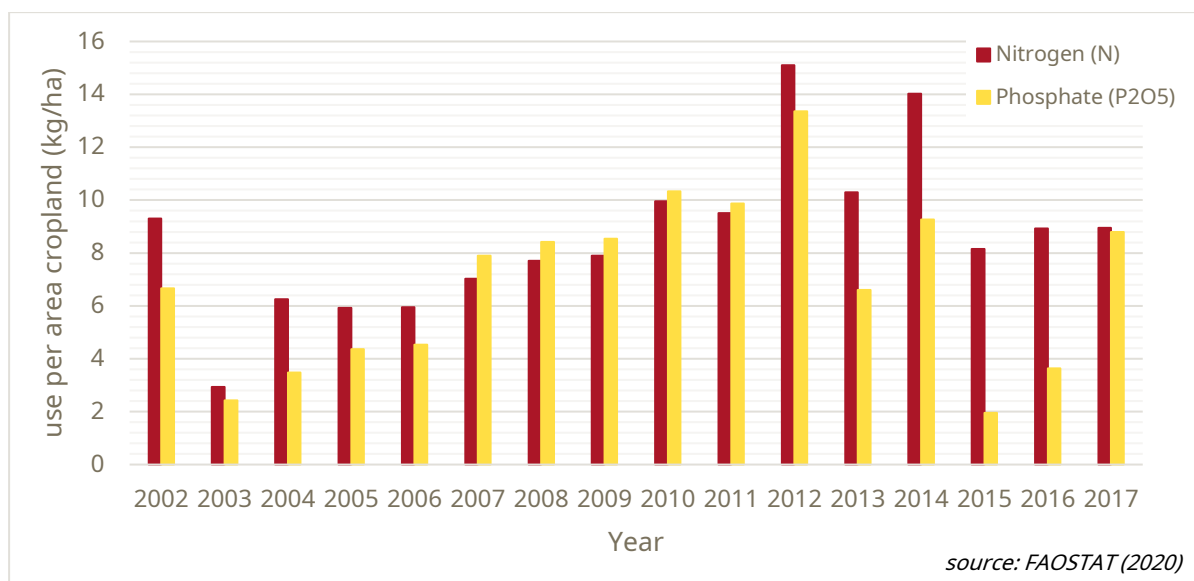


Figure 6: Average input use per area cropland (kg/ha)

The use of fertilisers is low due to a relatively high fertiliser-to-crop price ratio; fertilisers prices are relatively high, while farm-gate prices for agricultural produce are low due to limited market access (Agbahey et al. 2015). The sub-optimal use of fertiliser is attributed to both the lack of availability and high prices of fertilisers at supply side, as well as the lack of awareness of application rates and benefits of fertilisers at the demand side (Simtowe, 2015).

Currently, the most commonly available fertilisers are urea and DAP, but this is not in line with the diversity required for Ethiopia's wide-ranging crops and agro-ecological zones. The majority (about 90%) of these fertilisers are used for cereals (barley, maize, teff, wheat).

Fertiliser consumption in Tigray and SNNP is less than half the consumption in Oromia and Amhara regions. The unbalanced use of fertilisers further deteriorates soil fertility (IFDC, 2015). Key informants indicated that there is often a shortage of the agro-chemicals, including (blended) fertilisers, and prices highly fluctuate making agro-chemical inputs unaffordable for smallholder farmers. Limited availability of chemical inputs (herbicides, pesticides) result in price hikes, for example, in 2018 there was lack of supply of a popular herbicide (Palace), and in 2019 a lack of preservation chemical to treat seeds in storage.

Quality assurance

The quality control of agricultural inputs is the responsibility of the regional regulatory bodies (within BoANR), consisting of seed quality inspection, fertiliser and agro-chemical quality inspection and plant seed quarantine. The inspection of fertiliser and agro-chemicals includes the inspection of agro-dealers (including the issuance of certificates of competence), and of cooperative union warehouses and transporters. The inspections look at storage, packaging and handling of the inputs as well as produce quality. However, the inspection unit lacks laboratory infrastructure to perform fertiliser tests (e.g. nutrient testing) so inspection is carried out based on visual checks and moisture tests. In addition, inspections are carried out to check that the imported agro-chemicals sold by wholesalers or retailers are on a national list of registered agro-chemicals.

One key informant commented that the government's own input supply quality control is less stringent as it does not have the same difficulties in marketing and distributing its inputs. Government can distribute inputs to farmers without having to worry about profits or client satisfaction. Furthermore, there is a lack of capacity to oversee quality control at government level, increasing the risk of adulterated fertilisers (Simtowe, 2015).

Regulation and policies

The fertiliser supply chain is highly regulated by the GoE. AISE purchases fertilisers from international suppliers based on a seemingly transparent tender procedure. The strict rules for procurement and enforcement mechanisms play a significant role in regulating the market (Agbahey et al. 2015). Simtowe (2015) points out that the government subsidy programmes crowd out commercial demand and introduce uncertainty in the system, as they create disincentives for private companies to invest in distribution networks.

For many years, DAP and urea have been applied exclusively and uniformly across the country regardless of the crop need, soil type or agro-ecology. The major problem has been the lack of a soil fertility database and absence of area and crop fertiliser recommendations (IFDC, 2015). As part of its agriculture strategy (GTPII), the GoE invested US\$4 million in national soil mapping and another US\$4 million in the establishment of five fertiliser blends (AGRA, 2017). Since its launch in 2012, the Ethiopian Soil Information System (EthioSIS) has taken soil samples from the entire country to develop soil property maps and fertiliser recommendations for each region. The soil fertility status and fertiliser recommendation atlases address nutrient deficiencies of soils and contribute towards improved soil health.

5.2 AGRA change ambitions

AGRA's goal is to increase agricultural productivity. With the lack of quality inputs considered a key cause of low crop yields, AGRA's focus is on improved seed (see section on seed system) and properly formulated fertilisers, both organic and inorganic. As such, AGRA focuses in particular on the link between input retail and input use. In most countries, AGRA supports local SMEs that serve the agricultural sector with input provision. In Ethiopia, however, inputs are provided through the public institutions and the market share of the private sector is very small. AGRA's input strategy in Ethiopia therefore deviates from other countries, but is in line with the priorities of GoE, promoting a full package of technologies (improved seed, fertilisers, good agricultural practices).

For the current phase, AGRA seeks to scale up system- and farmer-level initiatives in four selected priority regions (Amhara, Oromia, SNNPR and Tigray) through (AGRA, 2017):

- strengthening the input supply systems and linkages to output markets to facilitate the uptake of yield-enhancing agricultural technologies;
- enhance the input distribution and accessibility through electronic voucher systems reaching 300,000 farmers;
- expand the network of last-mile agro-dealers by supporting local entrepreneurs in setting up businesses.

In Ethiopia, fertiliser distribution is organised through farmer cooperatives and the agricultural bureaus, hence AGRA is not promoting village-based agents in Ethiopia. Instead, AGRA aims to increase the density of input suppliers by supporting the ATA initiative to establish local agro-dealers linked to the FSCs through its consortium projects. The consortia identify small agro-dealers at *kebele* level who can be linked as local agents to FSCs. AGRA supports FSC-connected agro-dealers so they can develop into one-stop shops. The target is to support 40 agro-dealers, but at the time of the study, only 10 entrepreneurs had been identified for training. In addition, the AGRA country team was developing a proposal to provide small seed money to these individuals to start up their businesses.

In the current phase, AGRA finances two consortia that seek to increase productivity (by promoting the use of agro-chemical inputs, amongst other strategies) and structured markets of priority crops in the target regions. The consortium project 'Promoting a market-based production system for smallholder farmers in SNNPR through strengthening market-led agricultural extension and creating appropriate input-output linkages' (US\$1.3 million; 120,000 farmer beneficiaries) started at the end of 2018 (till September 2021), and is led by Oxfam in collaboration with ASE and SEPDA. The project focuses on the entire value chain of four crops: haricot beans, maize, teff and wheat. The project is implemented in 10 *woredas* distributed over five zones in SNNPR, and has two overall objectives: 1) Increase productivity (+30%) of haricot beans, maize, teff and wheat in SNNPRS; and 2) Strengthen and expand access to output markets for haricot beans, maize, teff and wheat producers in SNNPRS. The project aims to collaborate with 23 FTCs as entry points to reach 120,000 farming households directly and 200,000 indirectly in the region, as well as building the capacity of 190 extension workers, 320 SMEs, and FTC leadership. Demonstrating the effects of improved varieties and agro-chemical inputs makes up part of project activities, as well as improving farmers' access to inputs.

The project 'Improving market-led production of selected agricultural commodities in targeted *woredas* of Amhara and Tigray regions' (IMPACT) is led by SG2000, in collaboration with TechnoServe and FRI (grant: under revision; 205,639 beneficiaries). The project started in January 2019. The capacity building of farmers is primarily done through demonstration plots to show the effects of improved varieties and fertiliser application on crop yields. So-called 'mother demos' are implemented by lead farmers while 'baby demos' (five baby demos per mother demo) are implemented by follower farmers. The promoted technologies are: line planting, improved varieties (high-yielding, drought-tolerant), and organic and/or mineral soil amendments. The site-specific fertiliser applications are based on the recommendations of the EthioSIS soil map. The project provides inputs and facilitates support from DAs and subject matter specialists. Each DA in the targeted *woredas* is expected to support five mother demos.

Table 10 summarises AGRA's strategic choices regarding the input system (AGRA 2017).

Table 10: Overview of AGRA's interventions in the input system

Intervention	Potential partners	Approach to scaling
Enhance input distribution and accessibility through electronic voucher systems (eVoucher) Budget: US\$1.4 million Period: 2017-2020	ATA, cooperatives, regional bureaus	The use of an electronic system will allow for proper targeting of productive farmers and facilitate follow up on expected yield increases. The scaling partner would be the private sector input providers who work in partnership with government to honour vouchers. The availability of data in terms of which smallholder farmers are purchasing, the volumes, frequency would allow the companies to follow up with the same clients during marketing campaigns and address any emerging issues/challenges leading to repeat transactions
Support fertiliser blending into viable businesses	Cooperatives, regional bureaus	Private sector partnership to create more economically viable business models for input providers
Support development of blended fertiliser recommendations	ATA, EthioSIS	Knowledge initiative to improve economics for private sector players, with the support of ATA
Partner with government to strengthen the operational capacity of individual National Agricultural Research System (NARS) labs with particular emphasis on soil research	NARS, ISSD	Country support intervention with government as primary partner
Promote market-based production systems for smallholder farmers by strengthening input-output linkages	Consortia: Oxfam/ASE/ SEPDA SG2000/ TechnoServe/FRI	Consortium projects to improve farmers' access to input and output markets and increase productivity for commercial use. On the input side, this includes the capacity building of cooperatives, FTCs and FSCs, demonstration plots of improved technologies (incl. blended fertilisers), and the establishment of last-mile agro-dealers linked to FSCs. AGRA investment: US\$1.3 million for SNNPR

5.3 AGRA system change results

The Scaling Seeds and Technologies Partnerships, a joint initiative of USAID and AGRA, was implemented during 2013-2018, with the objective to increase farmers' access to agricultural technologies such as improved crop varieties, fertiliser blends, rhizobium inoculants and farm implements. AGRA also provided a grant (US\$562,326) to SG2000 for the large-scale promotion of potassium fertiliser. The private enterprise MBI also received a grant (US\$200,000) for equipment in 2015, increasing its production capacity by 40% at the time.

The input voucher system was formulated in 2014 in response to the difficulties that smallholder farmers face in accessing credit for agricultural inputs such as fertiliser, improved seeds, and labour-saving tools. The system engages local microfinance institutions or Rural Saving and Credit Cooperatives to qualify farmers for loans, and issues cash or credit vouchers that can be used to redeem inputs at nearby cooperative stores (ATA, 2020). The eVoucher is the automation of this input voucher system that is used by smallholder farmers to purchase inputs on credit. AGRA supported this initiative for the period 2017-2020. By 2019, a total of 737,783 smallholder farmers had registered to buy inputs with the automated system. However, that is only 54% of the original target. Some regions resisted the eVouchers as they have their own input distribution systems. Other challenges reported include high turnover of trained staff at regional governments, skill gaps, power shortages and limited internet access.

The consortia programmes funded by AGRA started late. Key informants reported that the first year was gone without anything happening due to reported misunderstandings between ATA and AGRA.

The IMPACT consortium started effectively in Tigray in January 2019. So far, the consortium has focussed on the capacity building of actors engaged in agricultural input marketing:

- Needs assessments were carried out in 2019 to identify key constraints in the production of wheat and teff;
- A two-day training for cooperatives and agro-dealers was held in May 2019 on seed certification quality, with 92 participants (18 females);
- FSCs received training on business management, financial literacy and market-based production systems. The consortia also promote FSCs among the farmers who receive training, consequently increasing FSC input purchases. One FSC mentioned it is also expecting to receive financial support to purchase motorbikes for input marketing and distribution.

The other Oxfam-led consortium noted that technology use in SNNPR is poor and pests and diseases increase during production and post-harvest due to climate change, resulting in high losses at these stages. The project is trying to address this. Although Oxfam is reluctant to promote chemical fertilisers, they acknowledge that there is a shortage of organic fertilisers and farmers seem to prefer chemical inputs. The consortium works with FTCs to generate more income so they can cover their operational costs. In addition, it aims to establish 23 private agro-dealers in *woredas* who will be linked to an FSC. So far, the consortium supports 10 agro-dealers by providing training, assisting in registration of the enterprise and providing a matching fund (seed money) for business start-up.

5.4 Analysis of AGRA results

AGRA's position in the intervention landscape

AGRA is one of few development partners that supports the input system, with a specific focus on fertilisers. MoANR indicated that there is no support from other development partners on the supply and quality control of pesticides and fertilisers.

Relevance

Lack of appropriate fertilisers (chemical and organic) is still a major issue that limits agricultural productivity in Ethiopia. With the development of EthioSIS map, it will be easier to provide appropriate fertiliser recommendations for different areas and different crops. AGRA's support in improving access to proper fertilisers is thus relevant.

AGRA is building on support that has already been provided by other development partners. FSCs, for example, received previous support from ATA to set up their business, after which, the organisation handed ownership over to the FSCs. AGRA is now building on what is there, supporting last-mile input suppliers to set up business. At the same time, AGRA is only weakly addressing system change dimensions. There is lack of competition within the fertiliser supply chain, and AGRA could play a policy advocacy role to gradually liberalise the fertiliser industry to encourage more private sector participation in the procurement, and distribution of fertiliser. It could also do more to support the organic fertiliser industry.

Expected impact

As most activities of the current phase started in 2019, it is too early to indicate the impact. Support provided through the consortia remains limited and is thus considered only to be relevant as a proof-of-concept for market-led approaches, rather than being expected to achieve major impact in terms of systemic change. The eVoucher grant has supported the registration of smallholder farmers for the automated input voucher system, but impact is very modest from a system-level perspective.

Sustainability

As two grantees noted, one project alone may not bring change to a country like Ethiopia, unless there are lessons and evidence that can be scaled by the government. Projects can demonstrate something that is different from the routine, which, if it influences government policy and practice, can eventually bring about change at scale. For example, the grantees try to show the importance of the FTCs if they are well managed and resourced. This approach (if successful) can then be scaled by the government in the future. But key informants were in agreement that one donor will not change all problems in Ethiopia, and collaboration with other stakeholders is thus important to achieve sustainable results.

PART II: SME survey

6 SME performance

6.1 Introduction

AGRA considers SMEs as important drivers of growth as they account for up to 90% of all businesses in sub-Saharan African markets. In many agricultural commodity value chains, SMEs also take up many of the downstream activities of processing, storage, transportation, wholesale and retail that are necessary to send farmers' produce to the end market.

An important pathway for change of the PIATA programme is supporting the development of SMEs operating in, and providing support services to, agricultural value chains. AGRA works to stimulate both demand and supply sides of technical assistance and financial products for SMEs. Core interventions focus on:

- Identifying high-potential SMEs and supporting them with business and technical advisory services to scale up operations. These advisory services involve a performance-based model for service providers. The model requires them to produce business plans and achieve results through effective support to SMEs;
- Matching grants for emerging medium-sized aggregation/storage businesses in under-served areas where smallholder farmers are increasing their yields, and marketing greater surpluses;
- Providing access to working capital finance for SMEs;
- Influencing the ecosystem within which SMEs operate by supporting the development of business, enabling goods and services such as packaging, commodity handling and processing machinery, as well as payment processing services and market data.

To assess the changes in performance of SMEs benefitting from the AGRA-PIATA programme, a rapid survey instrument has been designed. The baseline data collection was implemented and is reported here.

In the design of the monitoring tool the following needs were taken into consideration:

- A rapid and affordable tool to monitor SME performance;
- A tool which can be tailored to different SMEs, but still allow comparison and use across very different types SMEs;
- A tool which can be used for very different sizes of SMEs, including micro enterprises;
- A tool which can monitor change of performance of SMEs over time;
- A tool which can offer an immediate overview of SME performance;
- A tool which is simple, open access, and can be implemented across countries by enumerators with a reasonable level of education.

To answer to all these demands KIT has developed a simple SME performance scorecard.

6.2 Methodology

Performance dimensions

The scorecard for SME performance is based on monitoring four dimensions of performance:

- **Business resilience:** indicates the ability of the SME to adapt to disruptions while maintaining business operations, employment and assets. Variables used to determine business resilience are:
 - Years in business
 - Number of services offered
 - Diversity of clients
- **Financial stability:** indicates the financial health and access to financial services of an SME. The variables used to determine financial stability are:
 - Estimated total annual turn-over
 - Proportion of capital need covered with formal credit
 - Capital investments made over the last three years
- **Human capital:** indicates the education level and gender diversity of the SME workforce. The variables used are:
 - The proportion of staff having received a form of tertiary education
 - The proportion of staff with a permanent contract
 - The proportion of casual workers
 - The proportion of women among staff with a permanent contract
- **Technology/assets:** indicates the SME assets and investments in R&D. The variables used are:
 - Investments in R&D
 - Value of buildings
 - Value of equipment

For all of the above indicators, four levels are predefined, either numeric or descriptive, representing progression, with 1 being the lowest score and 4 being the highest score. In a way, the highest level represents what could be considered the desired state of the SME for the particular variable. The average of the scores gives the total score for each dimension. Performance scorecards are presented in Annex 2. An overview of all SME indicators and associated descriptive statistics are presented in Annex 3.

Sampling

Sampling was done among SMEs benefitting from AGRA support only. This has been done for the practical reason that SMEs not benefitting are not expected to be willing to answer questions about the performance of their enterprise. Also, the objective is monitoring the performance improvement of SMEs receiving support from AGRA, over time. The targeted sample in each country consisted of:

- 10 commercial seed producers
- 5 seed companies
- 10 traders
- 10 processors
- 10 agro-dealers
- 5 input supply companies

Sampling was done randomly from a list of SMEs provided by AGRA, which was validated with the local AGRA team. The sample distribution of types of SMEs was only considered a guideline, and adapted based on the investment portfolio of AGRA in each country.

In Ethiopia, 34 SMEs participating in the survey. The sample was composed as follows: 10 seed producers (seed multiplication cooperatives and unions), 13 seed companies (private and public seed enterprises), three agri-value chain actors (multi-purpose cooperatives,

primary cooperatives), and eight input companies (multi-purpose cooperatives, FSCs and agro-dealers). More information about SMEs participating in the survey can be found in Annex 4.

6.3 Performance dashboard

This section summarises the average performance per category of SME sampled in performance dashboards. A colour coding is used to indicate poor performance (red, score 1-2), average performance (orange, score 2-3) and good performance (score 3-4). A similar scoring has been calculated for each separate SME, but this is too much information to present in this report.

The data presented are to be interpreted as a performance baseline of the selected SMEs benefitting from AGRA interventions.

Seed companies (private and public seed enterprises)

Thirteen seed companies were sampled in Ethiopia. The summary results are presented in Figure 7. For business resilience, they obtained a low score, mainly due to the fact that they are young enterprises, having been in business for four years on average (see Table 15 in Annex 3). As these enterprises have been established for seed production specifically, they offer a limited number of services, namely sales of improved/certified seed or EGS production (see Table 18 in Annex 3). They serve a limited variety of clients, showing a low degree of market risk diversification (see Table 18 in Annex 3).

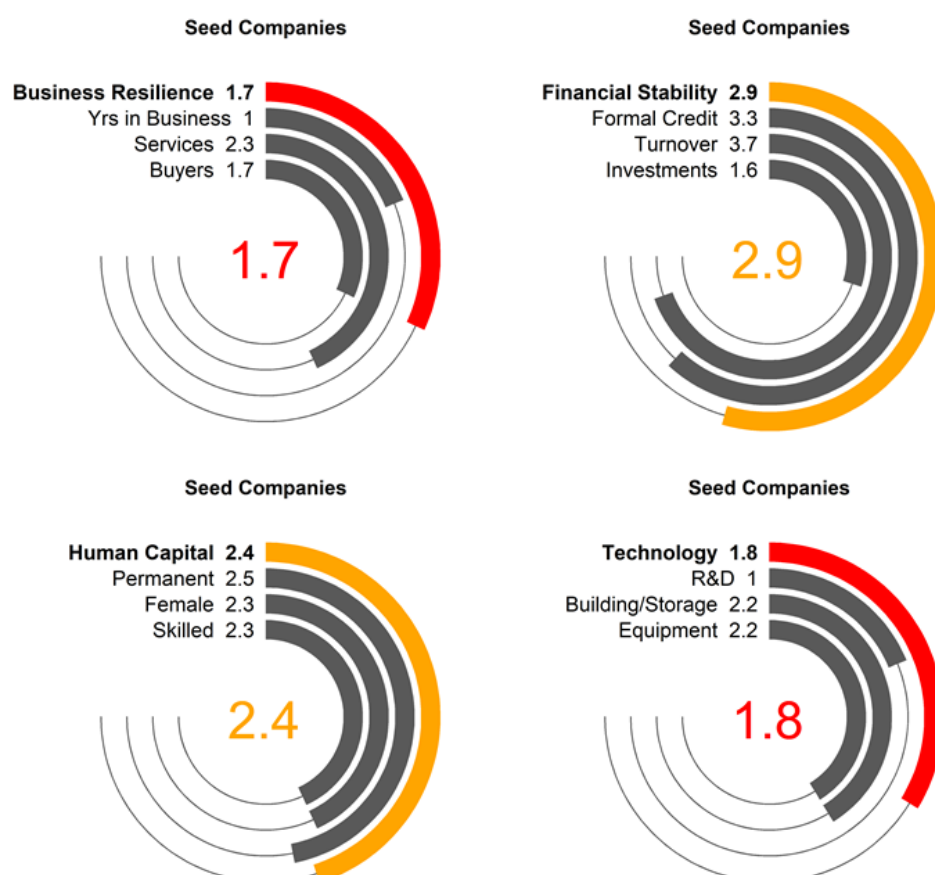


Figure 7: Seed companies' performance scorecard

The financial stability of the seed companies is showing a positive pathway to good performance; the use of formal credit is good, but investments are limited. The majority of the seed enterprises obtain grants from ATA. The seed enterprises have an average annual turnover of around US\$624,528 but with high variability between them (see Table 15 in Annex 3). They have a low score towards investments in new technologies. The seed enterprises have a moderate score with regard to human capital, indicating space for improvement in enrolling employees, especially female and skilled employees.

Seed producers (seed unions and cooperatives)

Ten seed producers (sampled from seed multiplication unions and seed cooperatives) were included in the survey. The results are presented in Figure 8. The business resilience of the seed producers is poor. They are often new to seed production, offering services mainly in the production and sale of improved or certified seeds. They deal with a limited number of client categories showing a high market risk diversification (see Table 18 in Annex 3).

The financial stability results indicate a good performance. Access to formal credit is good, and the seed producers made two investments on average in the past three years. The average annual turnover is US\$241,575. The human capital is scored as moderate, showing space for enrolling more female and skilled employees. The overall score for technology is low, showing little tendency toward investments in new technologies.

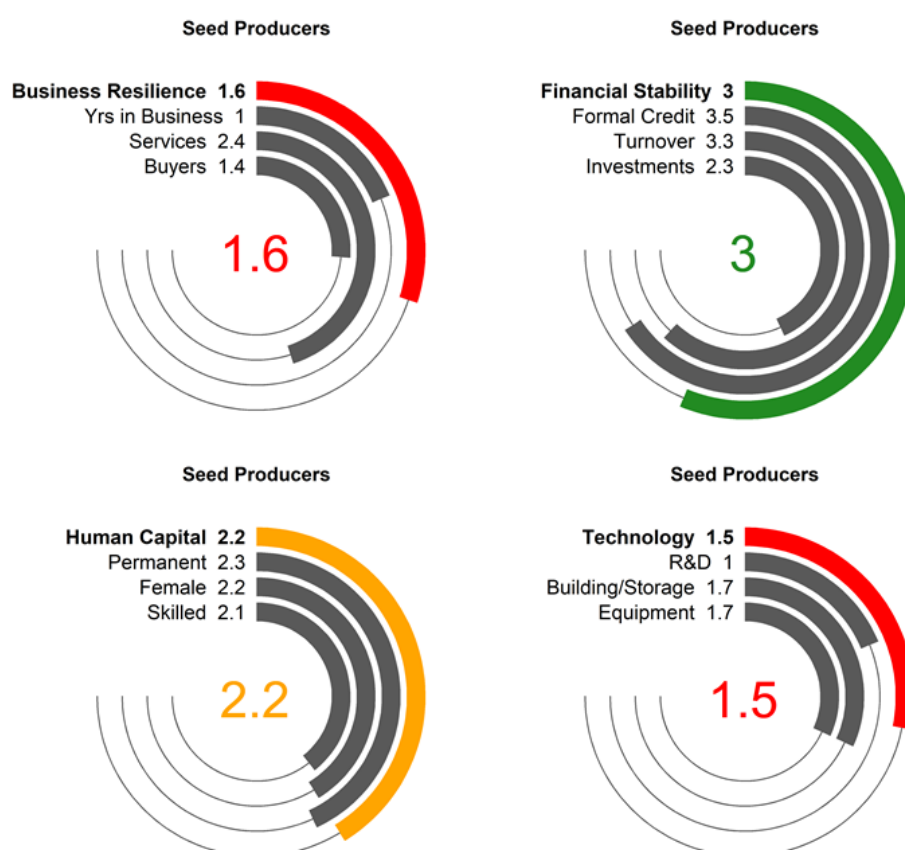


Figure 8: Seed producers' performance scorecard

Input suppliers or agro-dealers (multi-purpose cooperative and FSCs)

Eight input suppliers were sampled. The results are presented in Figure 9, which shows that business resilience is scored as low. This may be due to the fact that the FSCs are new

enterprises, having only been in business for two years on average (see Table 15 in Annex 3). The suppliers have also been created to offer just one specific service – retail of agro-chemical inputs and certified seeds (see Table 18 in Annex 3). They deal with two types of buyers on average, showing a poor market risk diversification (see Table 17 in Annex 3).

The financial stability is scored as good. The input suppliers have an average annual turnover of around US\$85,817 (see Table 15 in Annex 3). They also have good access to formal credit, mainly from ATA. However, the businesses do not invest much in their enterprises. The score for human capital is moderate; there is an opportunity to enrol more female and skilled employees. The score for technology is low as few input suppliers have made investments in the field of new technology in the last three years, which is not surprising given their recent establishments.

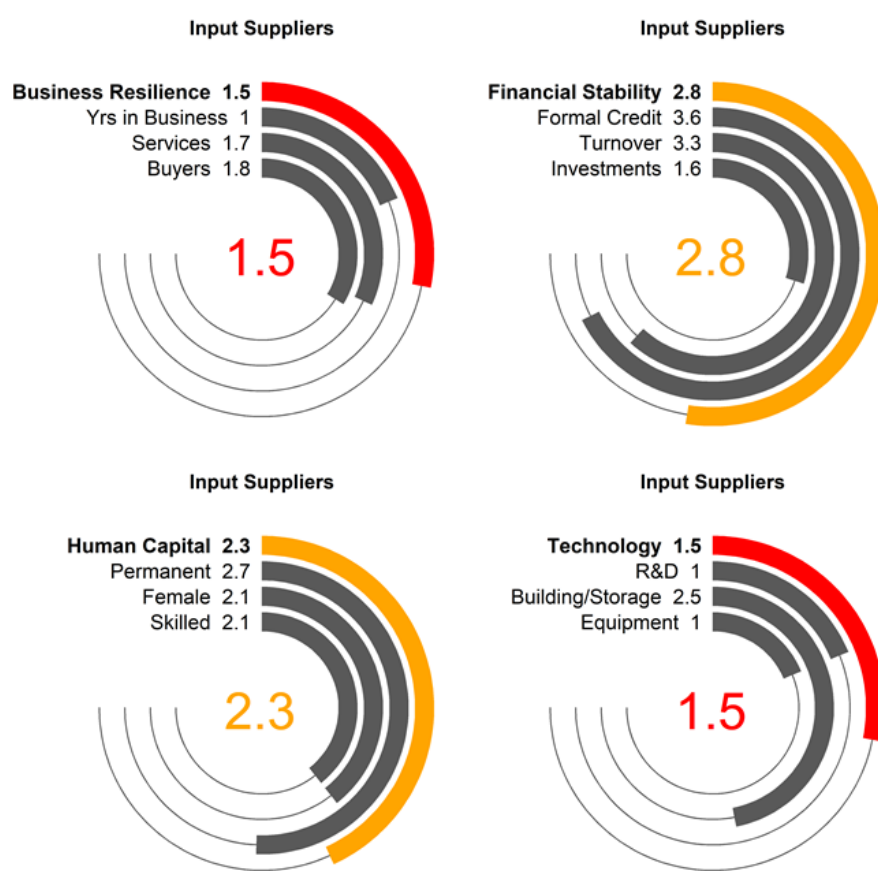


Figure 9: Input supply or agro-dealers' performance scorecard

Agri-value chain actors

Three SMEs (primary cooperatives and unions) were sampled as enterprises operating primarily in the value chain as aggregators or processors. The results are summarised in Figure 10. The business resilience is low due to the fact that these are new enterprises; they have been in business for almost three years on average (see Table 15 in Annex 3). The mandate of these cooperatives is specifically aggregation, and thus, that is the only service they offer. They deal with a limited diversity of client segments, showing a low degree of market risk diversification (see Table 17 in Annex 3).

Financial stability is moderate but signals a positive pathway toward good performances. The average score for the annual turnover is not considered since only one cooperative disclosed information on this point. The majority of these cooperatives have access to formal credit, but they have made almost no business investments in the last three years. There is room for improvement with regard to human capital, particularly regarding the enrolment of more female and skilled employees. The score for technology is low, as few investments in new technologies are being made.

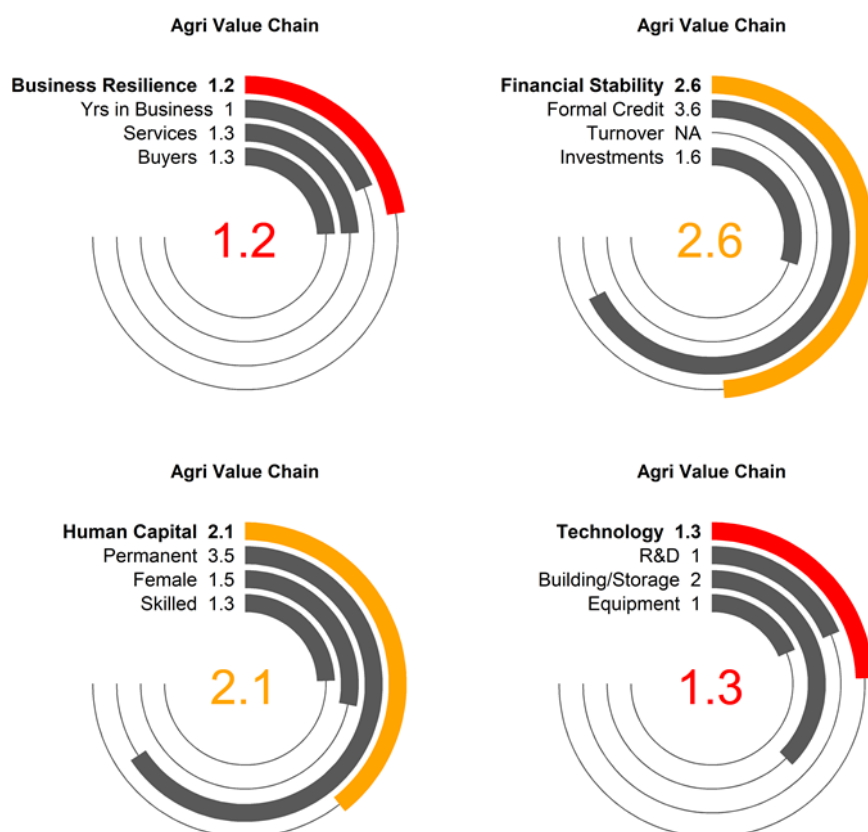


Figure 10: Agri-value chain actors performance scorecard

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Annex 1. List of key informant systems analysis

Organisation	Respondent	Department/ function	Date	Topic discussed	Relation to AGRA
Sasakawa Global 2000	Abebe Aragaw	M&E officer	2 Dec 2019	Seed system	Grantee
MoANR/Plant Health Regulatory Directive	Daniel Mekonnen	Project coordinator SSCCP	2 Dec 2019	Seed system	Consultant
MoANR/Plant Health Regulatory Directive	Ato Woldehawariat Assefa	Director General	2 Dec 2019	Seed system	Grantee
AGRA	Ayele Gebreamlak Samson Jemaneh	Programme officers	3 Dec 2019	AGRA programme seed system and input system	AGRA Ethiopia staff
EIAR	Dr Legesse Wolde	Plant Breeder	3 Dec 2019	Seed system	Grantee
Oxfam	Berhanu Dirirsa	Project officer	3 Dec 2019	Seed system	Grantee
Avalo seed enterprise	Dr Gete Zeleke	Owner	4 Dec 2019	Seed system	Grantee
Birhan Iba seed production cooperative (Tigray)	Haftom Tekaray	Chair person	5 Dec 2019	Seed system	Beneficiaries
Hadnet Raya seed multiplication and marketing union (Tigray)	Kalayu Berhanu	Union manager	5 Dec 2019	Seed system	Beneficiaries
IMPACT Tigray	Fisseha Bezabih	Project coordinator	6 Dec 2019	Seed system	Grantee
Tigray Bureau of Agriculture/seed inspection unit	Zehara Ademnur	Team leader seed quality inspection	6 Dec 2019	Seed system	Grantee
Maebal seed multiplication and marketing union (Tigray)	Girum G/Selam, G/Meskel Gidey	Union manager, and agronomist	6 Dec 2019	Seed system	Beneficiaries
Firetseba primary cooperative (Tigray)	Haile Estifanos, Mamo Berhe, Maireg araya and Hunesh Tewoldeberhan	Chairperson, Secretary, D/Chairperson and Treasury	7 Dec 2019	Seed system	Beneficiaries

Organisation	Respondent	Department/ function	Date	Topic discussed	Relation to AGRA
Zere Senay primary cooperative (Tigray)	Daniel Tilahun, Moges Abebe and Nigisti Kasahun	Chairperson and seed quality controllers	7 Dec 2019	Seed system	Beneficiaries
AGRA consultant for Tigray region	Gebru Desta	AGRA consultant	7 Dec 2019	Seed system	Experts
South Seed Enterprise	Lema Mulu	Head of dept of seed purchasing, processing and sales	9 Dec 2019	Seed system	Grantee
SNNPR Bureau of Agriculture/seed inspection unit	Aschalew Awgchew	Agro-chemical inputs expert	9 Dec 2019	Seed system/input system	Experts
Agro-dealer SNNPR	Wondimu Bogale	Shop manager	10 Dec 2019	Seed system/input system	Experts
Halaba Farmer Service Centre	Jemal Mushek	Manager	10 Dec 2019	Input system	Experts
Halaba Horisinka seed multiplication and marketing union	Abdela Seman	Manager	10 Dec 2019	Seed system	Beneficiaries
SEPDA	Dagnachew Abera	Agricultural development officer	10 Dec 2019	Input system	Grantee
Model farmer and DAs	Getachew Gesho; Maharu Achiso and Temesgen Ayele	Project participants	11 Dec 2019	Seed system/input system	Beneficiaries
Howora harara primary cooperative	Abebe Abora	Board member and store keeper of the union	11 Dec 2019	Seed system	Beneficiaries
Zereta Kambata seed multiplication union	Yosef Balewold	Union manager	11 Dec 2019	Seed system	Beneficiaries
Licha Hadiya multi-purpose union	Abeba Welamo	Agronomist	11 Dec 2019	Seed system	Beneficiaries
Ethiopian Seed Association	Melaku Admasu, Berhanu G/Medihin Mulugeta Inki	Manager, secretary, board chair	12 Dec 2019	Seed system	Beneficiaries/experts
Oromia Seed Enterprise	Hunde Dubre	Manager, seed production quality control dept	13 Dec 2019	Seed system	Grantee

Organisation	Respondent	Department/ function	Date	Topic discussed	Relation to AGRA
MBI	Dr Asfaw H/Mariam	Co-owner and technical manager	13 Dec 2019	Input system	Beneficiaries/experts

Annex 2: Performance scorecard

Table 11: Business resilience performance scorecard

Business resilience		Performance category 1	Performance category 2	Performance category 3	Performance category 4
Years in business	Ranges (Years)	1-5	5-10	10-15	>15
	Score	1	2	3	4
Number of services	Ranges (#)	1	2	3	>3
	Score	1	2	3	4
Number of buyers	Ranges (#)	1	2	3	>3
	Score	1	2	3	4

Table 12: Financial sustainability performance scorecard

Financial sustainability		Category 1	Category 2	Category 3	Category 4
Percentage using formal credit	Ranges (%)	0%	0%-33%	33%-66%	>66%
	Score	1	2	3	4
Annual turnover (US\$)	Ranges (thousands)	1-10	10-25	25-50	>50
	Score	1	2	3	4
Number of investments	Ranges (#)	0	1	3	>3
	Score	1	2	3	4

Table 13: Human capital performance scorecard

Human capital		Category 1	Category 2	Category 3	Category 4
% Female	Ranges (%)	0%	0%-33%	33%-66%	>66%
	Score	1	2	3	4
% Skilled	Ranges (%)	0%	0%-33%	33%-66%	>66%
	Score	1	2	3	4
% Permanent	Ranges (%)	0%	0%-33%	33%-66%	>66%
	Score	1	2	3	4

Table 14: Technology performance scorecard

Technology		Category 1	Category 2	Category 3	Category 4
Investments in R&D	Ranges (#)	0	-	-	1
	Score	1			4
Building storage	Ranges (#)	0	-	-	1
	Score	1			4
Equipment	Ranges (#)	0	-	-	1
	Score	1			4

Annex 3: SME descriptive statistics

Table 15: General SME characteristics

General SME Characteristics	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
Years of business	3.84 (1.06)	2.6 (0.84)	2.37 (1.40)	4.33 (0.57)
Average number of commodities				
Commercialized/traded	4.61 (5.95)	2.7 (1.7)		1 (1)
Processed		-		-
Transported		-		1.66 (2.88)
Main Commodities commercialized/traded				
Maize	84.62%	10%		66.67%
Teff		20%		
Wheat	15.38%	70%		33.33%
Permanent staff	26.45 (32.96)	7.5 (4.5)	3.87 (3.09)	5 (5.65)
Casual staff	109 (96.69)	38 (49.97)	7.87 (11.16)	8 (11.31)
Total annual turnover (USD)*	624528 (826170)	241575 (226474)	85817 (69132)	6665 (.)
Observations	13	10	8	3

Standard Deviation in parenthesis. *Incomplete information for Annual Turnover

Seed companies: Observations total annual turnover: 92%. Average turnover of two SMEs was excluded from the average since outliers with an average annual turnover 29,000,000 USD and 5,000,000 USD.

Seed producers: Observations total annual turnover: 100%.

Input suppliers: Observations total annual turnover: 100%.

Agri-Value Chain Actors: Observations total annual turnover: 33%

Table 16: SME employees

Employees	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
Permanent Staff	26.45 (32.96)	7.5 (4.5)	3.87 (3.09)	5 (5.65)
Casual Staff	109 (96.69)	38 (49.97)	7.87 (11.16)	8 (11.31)
% Female(over total)	28%	23%	22%	12%
% Skilled(over total)	26%	19%	25%	14%
Annual Salary	35133	14568	5193	11242
Permanent (USD)*	(36063)	(11032)	(2074)	(14378)
Annual Salary Casual	50267	6470	3220	7142
(USD)*	(44462)	(5124)	(3397)	(-)
Daily Wage Casual	2.7	4.62	3.41	4.65
(USD)*	(1.2)	(2.60)	(0.35)	(-)

Standard Deviation in parenthesis. *Incomplete information for Annual Salary and Daily wage. Detailed information reported below.

Seed Companies: Obs salary permanent workers: 76%; Obs salary casual workers 84%; Obs daily wage 84%. Two SMEs were not included in the average since outliers with number of permanent employees equal to 1373 and 149, annual salary of 4,086,048 USD and 6,987,544 USD; casual employees equal to 17322 and 12819 and annual labour cost equal to 1,61,111 USD and 291,477 USD.

Seed Producers: Obs salary permanent workers: 90%; Obs salary casual workers 90%; Obs daily wage 90%.

Input Suppliers: Obs salary permanent workers: 75%; Obs salary casual workers 62%; Obs daily wage 50%

Agri-Value Chain: Obs salary permanent workers: 100%; Obs salary casual workers 33%; Obs daily wage 33%

Table 17: SME buyers

Buyers	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
Projects, programs and government	23%	50%		
Farmer organizations, coops, associations	23%	0%	12%	
Individual buyers / producers	46%	20%	87%	66%
Traders, input suppliers, wholesalers	84%	70%	87%	66%
Average number of buyers	1.7 (0.83)	1.4 (0.69)	1.87 (0.64)	1.33 (0.57)
Observations	13	10	8	3

Standard Deviation in parenthesis

Table 18: SME services

SME Services	Seed companies	Seed Producers
Variety development	15%	
Breeder seed production	7%	
Production of early generation seed / foundation seed	38%	40%
Production of improved / certified seed	92%	100%
Production of noncertified seed		
Sales of improved / certified seed	84%	100%
Sales of non certified seeds	7%	
Sales of early generation seed / foundation seed	15%	50%
Average number of services provided	2.38 (0.76)	2.4 (0.51)
Observations	13	10

SME Services	Input suppliers
Retail (sales) of improved / certified seed	62%
Retail (sales) of chemical fertilizers and pesticides	75%
Advisory services / extension	37%
Import of inputs	
Wholesale and country-wide distribution	
Manufacturing of inputs	
Average number of services provided	1.75 (0.70)
Observations	8

SME Services	Agri Value Chain
Aggregation of farmer production (transport, bulking and storage)	66%
Agri-food processing (transformation of produce)	33%
Transport	33%
Mechanization	
Average number of services provided	1.33 (0.57)
Observations	3

Table 19: SME investments

Investments	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
Expansion of land area	7%			33%
Expansion of buildings and/or storage	30%	7%	50%	33%
Upgrading of equipment	30%	60%		
Research & Development				
Training of staff				
Increase / injection for working capital			14%	
No Investment	61%	30%	50%	66%
Average number of investments	0.69 (0.94)	1.3 (0.94)	0.62 (0.74)	0.66 (1.15)
Observations	13	10	8	3

Table 20: Percentage of credit from formal sources

Access to formal credit	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
0%	15.38%			
<10%				
10-25%		10%		
25-50%	15.38%	30%		
50-75%			37.50%	33.33%
75%-90%		20%	12.50%	33.33%
>90%	69.23%	40%	50%	33.33%
Observations	13	10	8	3

Table 21: AGRA support services

AGRA Services	Seed Companies	Seed Producers	Input Suppliers	Agri Value Chain
Grant	20%	25%		
Loan/Credit				
Training	40%	25%	62%	33%
Technical Assistance		25%	12%	
No Service	60%	75%	37%	66%
Average Number AGRA Services	0.61 (0.96)	0.90 (1.28)	0.75 (0.70)	0.66 (0.57)
Observations	13	10	8	3

Standard Deviation in parenthesis

Annex 4: SMEs participating in the interviews

Seed Producers	Seed Companies	Input Suppliers	Agri-Value Chain
Edget Bandint seed multiplication and marketing co.union LTD	Abdela and Family PLC	Amanuel Agriculture Farm Service Centre/one stop shop	Damot Multipurpose Farmers Cooperative Union
Ediget farmers seed producers coop. union	Amhara Seed Enterprise	Bahir Dar farm service center-Yimam Tessema	Ebot Gogora primary cooperative
Guna Seed multiplication and marketing coop.union Ltd	Avallo Seed Multiplication Pvt.Ltd.	Gota Negash Seed distributor	Sebatamet Multipurpose Cooperartive
Hadnet Raya Seed multiplication and marketing Coop.union Ltd	Ayehu Vingini Agriculture PLC	Hosaina Farm service center	
Hirity mekan Seed multiplication primary cooperative	Biniyam Mulat seed enterprise	Mankusa Multi-purpose cooperative	
Horsinka Halaba Seed Multiplication and Marketing coop.union Ltd	Ethio-Agri seft, Ayehu Agriculture development	Tamirat Gasiye Agro-dealer	
Meibale Seed Multiplication and Marketing Coop.union Ltd	Ethiopian Seed Enterprise	Wondimu Angacha Woreda input supplier	
Suluh Seed multiplication coopertives	Loma Enazmir PLC	Zemenay Farm Service Centre	
Suta primary cooperative	Migra Seed Enterprise		
Zerita Kambata seed multiplication and marketing Coo. union	Nile seeds PLC		
	Oromia Seed Enterprise		
	Semahegn Seed Multiplication		
	South Seed Eterprise		