SEED SYSTEM SECURITY ASSESSMENT

10 Districts of the Tigray, Somali, and Afar Regions, Ethiopia

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Ethiopian SEED PARTNERSHIP

MERCY CORPS

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Mercy Corps has been active in Ethiopia since 2004, partnering with government and civil society actors to drive bold and transformative ideas that build a more resilient country. Its programs are designed to be responsive to—and shaped by—participants and stakeholders.

About the Ethiopian Seed Partnership

The Ethiopian Seed Partnership (ESP) aims to increase food security, nutrition, and resilience for small-scale food producers by improving access to quality seeds of adapted varieties. The partnership targets one million producers, with a focus on reducing yield gaps for 500,000 and promoting sustainable agricultural practices across 12,500 hectares.

Funded by the European Union and the Government of the Netherlands, ESP is one of Wageningen University and Research's (WUR) flagship programs, with the objectives of ensuring the delivery of quality seed of adapted varieties to small-scale food producers across the country. The ESP program has four components that are implemented by three consortium members. Mercy Corps Ethiopia—in partnership with WUR—is responsible for implementing the component called 'Seed Insecurity Response in Fragile Contexts,' with the aim to ensure that seed response is effective and sustainable in targeted fragile areas.

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Acronyms

APARI	Afar Pastoral and Agro-pastoral Research Institute
ASE	Afar Seed Enterprise
CBSP	Community-based seed producers
DUS	Distinctness, Uniformity, and Stability testing
EAA	Ethiopian Agricultural Authority
EABC	Ethiopian Agricultural Business Corporation
EGS	Early Generation Seed
EIAR	Ethiopian Institute of Agricultural Research
ESA	Ethiopian Standards Agency
ESE	Ethiopian Seed Enterprise
ESP	Ethiopian Seed Partnership
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus group discussion
GDP	Gross Domestic Product
IITA	International Institute of Tropical Agriculture
KII	Key informant interview
MoA	Ministry of Agriculture
NGO	Nongovernmental Organization
PVS	Participatory variety selection
QDS	Quality Declared Seed
RARI	Regional Agricultural Research Institute
RBoA	Regional Bureau of Agriculture
RSE	Regional Seed Enterprise
SoRLARI	Somali Region Livestock and Agricultural Research Institute
SPC	Seed Producer Cooperative
SoRSE	Somali Regional Seed Enterprise
SSF	Seed Security Framework
SSSA	Seed System Security Assessment
TARI	Tigray Agriculture Research Institute
TPLF	Tigray People Liberation Front
TSE	Tigray Seed Enterprise
VCU	Value for Cultivation and Use
WFP	World Food Programme
WoA	Woreda Office of Agriculture
WUR	Wageningen Univeristy and Research
ZoA	Zuid Oost Azie (an International NGO providing relief and recovery)

Executive Summary

This Seed System Security Assessment (SSSA) was conducted in May 2025 in the Tigray, Afar, and Somali regions of Ethiopia. It examines the resilience of the seed systems in areas that have been impacted by protracted conflict, climate change, weak institutional support, and severe resource constraints. The study assessed the agroecological, social, and seed system context; farmers' acute seed security; and the chronic vulnerabilities undermining long-term resilience of the seed systems. This SSSA also provides recommendations to strengthen the seed systems in the Tigray, Afar, and Somali regions.

Agroecological, Social, and Seed System Context

The Tigray, Afar, and Somali regions are characterized by distinct agroecological zones, social dynamics, and institutional contexts, all of which shape seed security outcomes. Farmers in Tigray, Afar, and Somali cultivate a wide diversity of crops (including cereals, pulses, oilseeds, and vegetables) depending on their altitude, soil type, rainfall patterns, cultural backgrounds, and access to markets. Yet, conflict and drought have disrupted their production systems, resulting in land degradation, displacement, and the deterioration of local institutions and infrastructure such as roads, irrigation, and markets.

Socially, households struggle with severe labor shortages, financial constraints, and rare seed social networks, especially in the Somali and Afar regions. Gender dynamics are critical: women play central roles in crop production, household nutrition, and petty trade but face persistent disadvantages in land rights, access to credit, and labor availability. Female-headed households are especially vulnerable due to limited assets and social support, leaving them dependent on sharecropping or labor exchange arrangements.

Seed systems in these regions are dominated by informal channels. Farmers primarily rely on local markets, followed by saved seeds, local exchange, and seed aid to meet their planting needs. While these systems ensure a baseline of access, they provide little access to improved varieties and quality seed. Formal seed systems (including national research institutes, agrodealers, seed companies, and registered cooperatives) remain weak or absent, and are undermined by conflict, environmental stresses, and limited investment. New varieties typically reach farmers through free seed distributions by nongovernmental organizations (NGOs) and governments, which do not always align with local preferences or agroecological conditions.

Acute Seed Insecurity

Findings suggest that farmers in Tigray and Afar are not currently facing acute seed insecurity. Seed systems in both regions appear relatively stable, supported by a generally good 2024/25 agricultural season that ensured sufficient seed availability and access. While localized challenges may persist for certain crops or groups, there is no widespread indication of acute seed stress.

Farmers in Somali are experiencing some level of acute stress in seed access. Although grain is generally available in local markets—and many farmers continue to rely on these markets to source grain for planting, the overall seed security situation remains fragile. The 2024/25 agricultural season was poor, leaving many households with limited resources and minimal saved seed stocks. Consequently, a proportion of farmers report plans to reduce their planting area or plant less seed than usual in the 2025/26 season. These patterns suggest emerging, localized seed stress linked primarily to reduced purchasing power and depleted household reserves, rather than a complete breakdown of seed availability.

Chronic Seed Insecurity

The SSSA revealed significant structural weaknesses that contribute to chronic seed insecurity in the Tigray, Afar, and Somali regions. Farmers' heavy reliance on informal sources limits access to improved varieties that are more tolerant to pests and drought. Climate variability, recurrent droughts, and conflicts have eroded seed security, while weak infrastructure limits market access and the diffusion of seed technologies. Together, these factors perpetuate cycles of vulnerability, where seed access is adequate in the short term but persistently fragile over time. The destruction of agrodealer networks, nurseries, and cooperatives during the conflicts has also reduced local seed supply. The farmers lack sustainable market-based sources of improved seed, especially for their most important food security crops—wheat, maize, tef, sorghum, and barley. Agrodealers and private seed companies are nearly non-existent, creating a void in sustainable market-driven innovation. As a result, the introduction of new varieties is sporadic and driven mostly by foreign aid, leaving farmers little agency in varietal choice. This chronic seed insecurity is compounded by gender disparities. Women farmers face disproportionate labor demands, limited credit access, and systemic barriers to land ownership, restricting their ability to invest in high-quality seed.

Recommendations

Building on the findings of both acute and chronic seed insecurity, the recommendations outline actions to strengthen seed system resilience across Tigray, Afar, and Somali. Addressing the findings requires a dual approach: sustaining short-term stability through timely monitoring and targeted support, while investing in long-term system strengthening.

1. **Strengthen Local Seed Production and Multiplication Systems:** Strengthen local seed production—through community-based seed producers, cooperatives, and farmer-led enterprises—to help ensure that farmers have access to diverse, well-adapted, and affordable seed close to home.

2. **Enhance Varietal Innovation and Adaptation:** Strengthen the link between national research programs and regional seed systems to increase access to improved and locally-adapted varieties. This includes expanding participatory variety selection (PVS) trials, promoting lowland-appropriate, drought-tolerant varieties, and ensuring that breeding programs incorporate farmer preferences for key crops.

3. **Strengthen Varietal Quality:** Research and development efforts should establish platforms that connect breeders at regional research institutes and farmers to jointly develop and identify varieties that meet the needs of both male and female farmers. Strengthen farmers' capacity in seed production and preservation and pre- and post-harvest management practices; conduct demonstrations of quality seed production under recommended practices; and facilitate access to cost-effective post-harvest technologies to enable farmers to learn how to produce quality grain and seed, thereby decentralizing access to improved varieties.

4. **Strengthen Farmer-Led and Decentralized Seed Systems**: Enhance informal seed system quality and performance through training farmers and local seed traders in selection, handling, and storage techniques to improve seed viability and purity. Additionally, strengthen the capacitiy of existing decentralized seed production structures—regional research institutes, regional seed enterprises, and cooperative networks—to produce and deliver new and locally adapted varieties.

5. **Promote Market-Based Seed Access and Private-Sector Engagement:** Strengthen local markets, attract private investment, and link farmers more directly with reliable suppliers of quality seed by improving the last-mile seed delivery network; stimulating demand through inclusive mechanisms; incentivizing private sector participation and innovation; and formalizing and strengthening capacity of local seed traders.

6. **Rehabilitate and Invest in Seed Infrastructure:** Key investments could include irrigation infrastructure, seed storage facilities, quality testing equipment, processing units, and basic mechanization.

7. **Improve Coordination, Regulation, and Institutional Support:** Strengthening coordination among regional agricultural bureaus, research centers, NGOs, and private sector actors to create a more coherent seed system. Improved regulatory capacity—especially in seed quality control, certification, and varietal release—will ensure that both public and private seed actors operate under clear and trusted standards.

8. **Maintain Seasonal Monitoring and Early Warning for Seed Security:** Periodic monitoring—such as local market functionality, seed price trends, and farmer planting intentions—is vital to detect emerging risks.

9. **Further Cross-cutting Recommendations:** Advance gender-responsive programming such as credit schemes tailored for women, promote labor-saving technologies, and ensure women's inclusion in varietal testing, seed multiplication, and market initiatives. Additionally, phase out unsustainable direct seed distributions by using market-based responses whenever possible.

I. Introduction

Agriculture is the backbone of Ethiopia's economy, yet ensuring food security—especially in the vulnerable regions of Tigray, Afar, and Somali—continues to be a major challenge. These arid and semi-arid areas face recurring threats such as drought, conflict, and limited resources, which affect agricultural productivity and resilience.

Seed systems play a vital role in ensuring agricultural productivity, enhancing resilience, and securing food supplies. Gaining a clear understanding of seed security is key to assessing how effectively farming communities can maintain crop production in the face of climate change, economic instability, or social disruption. Seed systems in Ethiopia function through three main channels:

- **formal**: including government and private sector production and distribution of quality seeds of improved varieties
- **informal**: such as farmer-saved seed, local exchanges, and community-based networks
- **intermediary**: such as seed producer cooperatives and community-based seed production and supplies.

However, these systems have been severely disrupted in recent years. In Tigray, widespread conflict has caused displacement, destruction of infrastructure, breakdowns in input supply chains, and the loss of both seed stocks and extension services. As a result, many farmers now rely on unreliable or low-quality seed sources. While Afar and Somali have not experienced the same level of conflict intensity, they still face intermittent resource-based conflicts, the effects of climate change, and the social upheaval associated with shifting livelihoods from traditional pastoralism to more crop-based systems. This ongoing shift toward rainfed and riverbank farming necessitates an accurate and up-to-date understanding of the evolving dynamics of seed systems in agro-pastoral settings.

To address these challenges and information gaps, a Seed System Security Assessment (SSSA) was conducted[1] from May 15-25, 2025 across ten conflict- and climate-affected woredas in the Somali, Afar, and Tigray regions of Ethiopia. **SSSAs evaluate the performance of local seed systems, identify farmer groups at greatest risk, and assess impacts on seed diversity and agro-biodiversity.** Using a mixed-methods approach—including focus group discussions (FGDs), household surveys, and key informant interviews (KIIs)—the study gathered data from farmers, traders, processors, research centers, seed enterprises, seed producers, nongovernmental organizations (NGOs), and governmental organizations. The SSSA investigated the diversity of crops and seed systems in the target regions, examined the impacts of shocks and stresses such as drought and conflict, and evaluated the resilience of local seed systems, including exploring the role of indigenous knowledge in maintaining seed security.

The findings from this SSSA will guide the design of context-specific interventions—such as seed distributions, voucher-based approaches, and support for local seed multiplication, particularly for drought-tolerant varieties. They will also help humanitarian and government actors identify market-based approaches that can strengthen the resilience and sustainability of the local seed systems in these fragile regions.

[1] The SSSA was commissioned by Mercy Corps under the Ethiopian Seed Partnership (ESP): Seed Insecurity Response program. ESP is funded by the European Union and Government of The Netherlands, through Wageningen University and Research.

II. Background to Seed System Security Assessments

This section delves into the fundamental concepts, key dimensions, and various forms of seed insecurity, offering a structured approach to analyzing and interpreting seed systems.

II.1. Understanding Seed Systems

Seed systems are typically organized into three main sub-systems: formal, informal, and intermediary.

Formal seed system: This system focuses on the development and distribution of improved seed varieties with high genetic and physical quality. These varieties are usually developed by national and regional research institutions and propagated by certified seed producers. Government agencies oversee the seed certification process, while commercial companies (such as parastatal seed enterprises, universities, research institutes, private seed producers, and cooperative unions) handle production, marketing, and distribution.

In Ethiopia, seed production in the formal seed system is highly dominated by public seed enterprises. Despite the formal seed producers having relatively strong internal quality control systems, the multiplication is primarily controlled and certified by the external regional or federal regulatory bodies. These formal actors are mainly responsible for producing and supply breeders with pre-basic seed, basic seed, and certified seeds. Suppliers of pre-basic and basic seed are public seed enterprises and a few licensed private seed companies. Regulatory agencies, along with all actors involved in the seed chain, supervise the production and distribution of certified seed. In Ethiopia, the formal seed system provides around 10-20% of certified seeds of improved varieties used by smallholder farmers.

Informal seed system: This system constitutes millions of individual small-scale farmers, who save or exchange seed at the local level. It involves the production, exchange, and sale of mainly traditional or local varieties, though it may also include improved varieties that have entered local circulation. Seeds are typically sourced through farmer-to-farmer exchange, local markets, or saved from previous harvests. Because seeds are often sold as grain (i.e., potential seed), distinguishing seed from food can be difficult in this system. The informal seed system provides around 90% of seeds used by smallholder farmers in developing regions globally; about 80-90% across all of Ethiopia; and 85-95% in the Afar and Somali regions.

Intermediary seed system: This hybrid system bridges formal and informal systems, often through the work of small-scale enterprises or community organizations. The intermediary seed system has overlapping features with both formal and informal seed systems. In the intermediary system, cooperatives may be licensed to produce and sell seed. However, they do not necessarily go through formal channels to get planting materials, and their internal quality control system is usually done by an unprofessional seed quality control committee, which is not as strong compared to the formal seed system. The seed governance structure is loose and often supported by different NGOs, and also focuses on local production and marketing. In this system, both certified and Quality Declared Seed (QDS) could be multiplied.

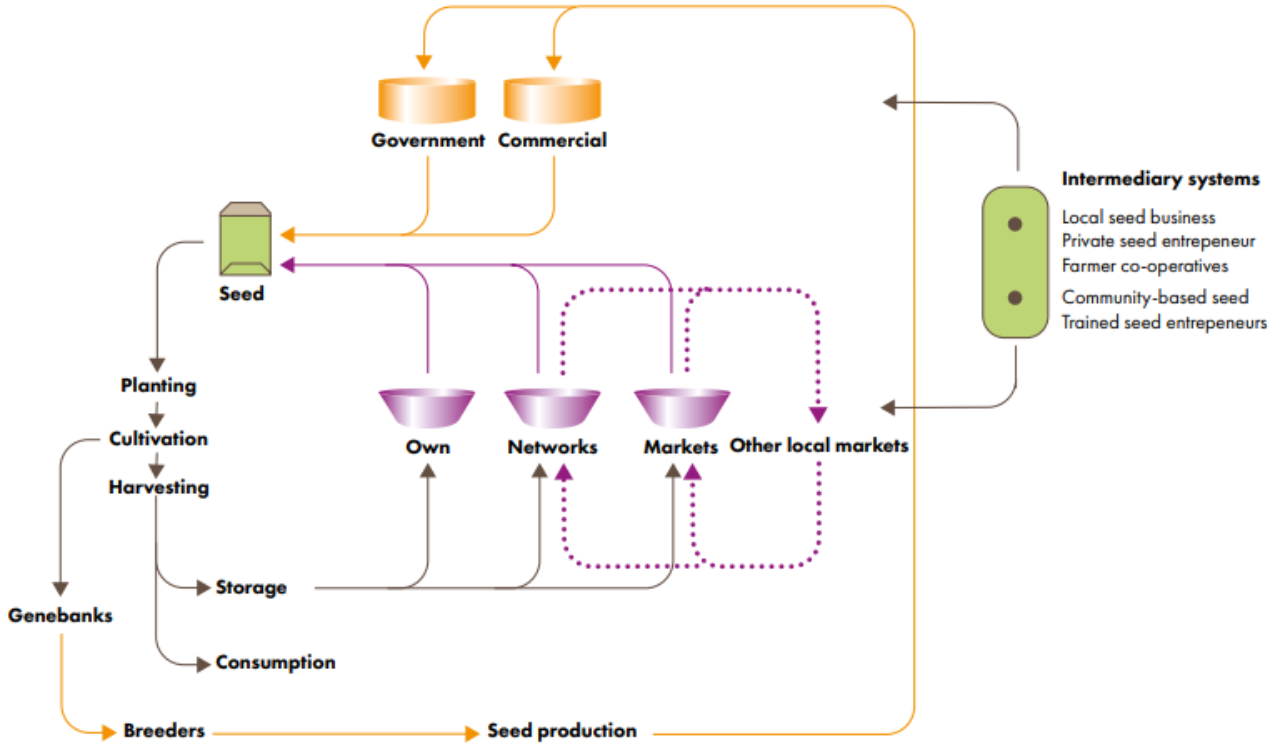
These actors facilitate the movement of seeds between systems, and produce, market, and distribute both improved and local varieties as certified seed or QDS. A common example includes Primary Seed Producer

Cooperatives (SPCs): farmers' groups-based seed production supported by NGOs and governments to produce clean planting materials for major food security crops such as wheat, tef, sorghum, or major pulse crops.

These three sub-systems are closely connected. Improved seed varieties are typically developed by researchers, then propagated/multiplied by licensed producers, and distributed through direct seed marketing, agents, agrodealers, and multipurpose cooperatives. Once these seeds reach farmers, they often enter the informal seed system, where they are cultivated, exchanged, and sold within local communities. While the informal system is primarily composed of traditional varieties well-suited to local conditions, it also incorporates grain produced from improved varieties over time. However—as most farmers practice—upon production of grain from an improved variety, the grain may continue to circulate in the production systems as potential seed and its quality is not guaranteed.

The image below illustrates the various sources farmers use to obtain seed. Informal channels include farmer saved seeds from previous harvests, exchanges with relatives or neighbors, and purchases from local grain markets. In contrast, formal channels involve varieties released through formal plant breeding and multiplied and distributed through commercial channels by seed companies, government, or other authorized institutions, farmer groups/seed enterprises, and emergency or aid-based seed organizations.

Figure 1: Farmers obtain seed via the informal, formal, and intermediary seed systems



Source: Sperling et al., 2022

II.2. Understanding Seed Security

Seed system security means that farming households are able to obtain sufficient amounts of preferred varieties of quality seeds at appropriate times and at affordable prices. A secure seed system is essential for safeguarding food security and enabling farmers to sustain and improve crop production—even amid climate variability, economic shocks, or conflict.

II.2.a. Seed Security Framework

The seed security framework (SSF) helps development professionals and donors evaluate the resilience and long-term viability of the various seed systems that farmers rely on. The SSF is built on four key pillars: availability, accessibility, physical seed quality (including health), and the suitability or desirability of the variety (varietal quality).

- **Availability** – the physical presence of adequate seed supplies in a region at the time farmers need them. This aspect considers whether the necessary quantities of seed are locally accessible or can be sourced from external areas in time for planting. The availability of seed is influenced by both local seed production and the efficiency of distribution systems.
- **Accessibility** – a farmer's ability to acquire seed, which depends on both financial means and social connections. This dimension evaluates factors such as household income, local market dynamics, and the strength of social networks that facilitate seed sharing or exchange. Broader socio-economic conditions—including market prices, poverty levels, and social inclusion—play a significant role. In situations where farmers face economic hardship or social exclusion, their access to seed may be limited, increasing the risk of seed insecurity.
- **Seed Health / Quality** – the physical, biological, and sanitary condition of the seed. It includes factors such as germination rate, varietal purity, and the absence of pests or diseases. Low-quality seed can significantly reduce crop performance and yield, making it a vital factor in evaluating seed security.
- **Varietal Quality** – how well a seed variety matches the local environmental conditions and meets farmers' needs. It reflects the genetic adaptability of the variety to specific agroecological zones, as well as its alignment with the preferences of both women and men farmers—for example, in terms of market demand, processing characteristics, cooking qualities, and taste.

Seed security is achieved when all four components—availability, accessibility, seed quality, and varietal quality—are adequately met. Most cases of seed insecurity involve gaps in one or more of these components; it is relatively uncommon for all four to be compromised simultaneously. The primary aim of an SSSA is, therefore, to identify which specific aspects of seed security are failing. By pinpointing the exact nature of the problem(s), an SSSA can deliver precise, context-specific recommendations.

II.2.b. Acute and Chronic Seed Insecurity

Seed insecurity falls into two main categories: acute and chronic.

- **Acute seed insecurity** arises from sudden shocks—such as natural disasters, conflict, climate shocks, or economic collapse—that disrupt short-term access to and availability of quality seed. Examples of shock events include climate shocks resulting in sudden pest and disease outbreaks, floods, extreme drought, earthquakes, civil war, market shocks, and ethic- or resource-based

conflicts causing mass displacement, asset losses, and destruction of seed system infrastructure. These events often cause immediate and widespread shortages. In response, development and humanitarian actors focus on rapidly restoring access to quality seed for affected communities.

- **Chronic seed insecurity** is a long-term condition typically driven by systemic factors such as poverty, social exclusion, environmental degradation, cumulative impacts of climate changes—which are also exacerbated by acute situations, and weak or harmful seed policies. Farmers facing chronic seed insecurity consistently struggle to access quality seed, resulting in lower productivity and greater vulnerability to shocks and stresses. Some of the indicators of chronic seed insecurities are cyclical shortages of quality seeds, high dependency on the informal seed system, and uses farmers' non-preferred varieties. Tackling this challenge requires ongoing efforts to strengthen all seed systems farmers rely on, improve access to markets, and support resilient and sustainable farming practices.

The distinction between acute and chronic seed insecurity is not always clear-cut, as the two can overlap and reinforce one another. For instance, farmers operating within a chronically weak seed system—e.g., lacking access to improved varieties —may be hit by an acute shock, such as regional conflict, which destroys their fields and seed reserves. This not only worsens their immediate situation but also deepens long-standing problems with seed quality. Conversely, an acute event like flooding can evolve into a chronic stress if it occurs frequently enough to continually disrupt seed systems.

II.2.c. Response Options

An SSSA helps surface the seed system constraint(s), and whether an area is experiencing chronic or acute seed insecurity. Once the unique seed insecurity dynamics are understood, context-specific interventions can be designed to address them. Table 1 outlines examples of potential response options tailored to particular seed security challenges. For more detailed guidance on response options, including market-based approaches, visit the Seed Emergency Response Tool (SERT) (Sperling et al., 2022).

Table 1. Categories of Seed Insecurity and Example Response Options

Seed Security Constraint	Potential Short-Term Responses for Acute Seed Insecurity	Potential Long-Term Responses
Availability	Direct seed distribution	Promote local seed production and support the growth of seed enterprises through smart subsidy as means of resilient seed production and supply
Access	Seed fairs using vouchers or cash, local purchase and distribution using vouchers or smart subsidies	Implement poverty alleviation strategies, including support for agro-enterprise development and alternative income-generating activities
Seed Health / Quality	Supply of healthy or treated seed by seed producers and/or seed marketing agents	Technical capacity building for farmers and seed producers on quality seed production practices; demonstrate cost effective post-harvest technologies (e.g PICS); strengthen capacity of potential seed suppliers; strengthen the internal and external seed quality control systems
Varietal Quality	Seed fairs or direct seed distribution with a focus on locally adapted varieties	Engage in participatory variety selection to identify varieties that are both locally adapted and meet farmers' preferences

III. Methodology

III.1. Literature Review

The research team began the SSSA with a desk review of existing literature to establish a foundation of background knowledge. This included secondary data related to the development, release, production, and marketing of seeds in Ethiopia and a comprehensive literature review focusing on seed system security, institutional structures, legal frameworks, and relevant studies conducted in conflict zones globally.

III.2. Fieldwork

To complement the literature review, fieldwork was conducted in the Afar, Tigray, and Somali regions from May 15th-25th, 2025—during the agricultural off-season—to gather data on seed supply and demand.

III.2.a. Survey Tools and Sample Sizes

To gain a comprehensive understanding of the formal, informal, and intermediary seed systems in these three regions—so as to understand the seed system security status—the assessment team conducted:

- **250 household surveys**;
- **30 focus group discussions (FGDs)** comprised of 20 with mixed community groups—male and female participants representing diverse demographics and socio-economic strata—and 10 with female-only groups; and
- **53 key informant interviews (KIIs)** with actors across the seed systems in all three regions (see Table 2).

Table 2. Investigative methods used in this 2025 SSSA in the Afar, Somali, and Tigray regions

Type of Investigation	Number of Interviews
KEY INFORMANT INTERVIEWS	53
• NGOs	3
• Regional Research Institutes	3
• Regional Seed Enterprises	3
• Large Traders	1
• Grain/Local Seed Vendors	10
• Agrodealers	5
• Agro-processers	6
• Government Authorities	13
• Seed Producers	9
FOCUS GROUP DISCUSSIONS	30
• Focus Group Mixed	20
• Focus Group Women	10
HOUSEHOLD SURVEYS	250

The interviews were structured around four thematic areas: the development and release of new varieties; decentralized seed multiplication; farmer access to innovative germplasm; and farmer access to grain and seed markets. This systematic approach ensured the rigorous collection of relevant information from all stakeholders in the local and national seed systems and provided a comprehensive understanding of the constraints and opportunities within the seed system.
To interpret the data, the team used a combination of qualitative and quantitative methods, including statistical tools such as T-tests and chi-square analysis.

Female focus group discussion participants. Credit: Nugus Kassa

III.2.b. Site Selection

Central to the SSSA methodology is an understanding of agroecological and livelihood zones, which shape both agricultural practices and seed system dynamics. The assessment team used a context-sensitive approach to selecting intervention sites, focusing on areas where seed security is most at risk due to a combination of environmental and socio-economic vulnerabilities.

This assessment focuses on 10 districts across three regions, selected for their relevance to the ongoing implementation of the ESP program. While the findings are specific to these districts, they provide valuable insights into conditions likely shared by neighboring areas with similar agro-ecological and socio-economic profiles. Understanding these regional nuances is essential for designing effective, scalable strategies that enhance seed system functionality, improve agricultural productivity, and build long-term resilience in vulnerable communities.

Table 3. Districts and Regions targeted by this SSSA, 2025

Region	District
Tigray	Alage
	Indamehoni
	Raya Azebo
	Dagua Tambien
Somali	Tuli Guled
	Haroreys
	Owbare
Afar	Amibara
	Afambo
	Dubti

III.3. Limitations

Despite careful training, the assessment team noted that the large number of survey and interview tools led to confusion with some enumerators. The consultants reduced the potential data error through cross-referencing various sources to identify and report on trends.

Additionally, respondents had different reference points for some questions, such as “quantity normally sown,” and are primarily relying on recall for quantities planted. This led to data quality inconsistencies for some respondents. For example, one farmer responded that he normally plants 20 kg of maize when asked to compare *last* season to his normal amount. However, when discussing how his normal quantity compares to what he plans to plant *next* season, the same farmer responded that he normally plants 30 kg of maize. While the “normal” quantity would ideally not change year to year for this comparison, the assessment team has decided to present the imperfect data as-is, since it reveals some interesting trends.

Lastly, some questions related to the conflict assessment were sensitive to ask in group settings. Thus, the depth of inquiry into those findings is a bit shallower than anticipated.

IV. Agroecological, Social, and Seed System Context

Agriculture is central to Ethiopia's economy, comprising roughly 39% of the national gross domestic product (GDP) and supporting over 80% of the population through employment and livelihoods. Despite its importance, the agricultural sector remains largely subsistence-based, with crop yields below the sub-Saharan average. The low yields are largely due to reliance on seasonal rainfall, limited access to improved varieties of quality seeds, and the growing impact of conflict, which disrupts farming activities and access to essential inputs and markets.

This section details the regional context and variations within which these seed systems operate. Understanding regional variation in agricultural systems, landholding size, resource constraints, social dynamic, and conflicts is essential for tailoring seed system interventions. Strategies must account for the scale of production, rainfall constraints, and demographic pressures to ensure that seed access solutions are both appropriate and effective within each context.

IV.1. Agroecological Context

The Afar, Tigray, and Somali regions are characterized by distinct patterns of agricultural activity. In the Tigray region, nearly all rural households rely on subsistence crop production and livestock farming. A small portion of rural households in the Tigray region supplement their income with petty trade and other market-oriented pursuits. In contrast, the Afar and Somali samples demonstrate a significantly higher dependence on livestock production, but that has been shifting toward mixed farming system.

IV.1.a. Landholding Patterns

Landholding patterns also vary across the three regions, reflecting differences in agroecology, population density, and livelihood systems. Households in Afar and Somali have access to much larger tracks of arable land: 47% of surveyed households in Afar and Somali farmed more than 2 hectares and another 43% farmed between 1 and 2 hectares (see Table 4). These relatively large holdings in Afar and Somali are largely attributed to greater land availability in pastoral and agro-pastoral systems, where lower rainfall levels and population densities lead to more extensive agricultural systems. In contrast, landholdings in Tigray are significantly smaller, reflecting higher population density and greater land fragmentation. The majority of surveyed households in Tigray reported cultivating less than one hectare, with 47% of households managing plots between 0.5 and 1 hectare, and another 47% cultivating less than 0.5 hectares. These smaller land sizes not only restrict agricultural output but also increase vulnerability to climate and market shocks, particularly in a context where rainfed agriculture predominates.

Table 4. Access to arable land among households in the Tigray, Afar, and Somali regions

Cultivated Land	Tigray	Afar and Somali
< 0.5 ha	**47%**	1%
0.5 - 1.0 ha	**47%**	11%
>1.0-2.0 ha	6%	**41%**
> 2.0 ha	0%	**47%**

IV.1.b. Crop Profiles

The farmers' crop profiles varied significantly between regions according to the household surveys. Farmers in Tigray focused more on wheat and *tef*; farmers in Afar focused on maize and vegetables; and farmers in Somali focused almost exclusively on wheat, sorghum, and maize (see Table 5). Additionally, in Somali and Afar—historically pastoral and agro-pastoral zones, where farmers produce a lower diversity of crops—there appears to be an emerging trend towards crop production.

Table 5. Crop profiles among households in the Tigray, Afar, and Somali regions for last seasons (ordered according to total production throughout the 3 zones) (n=250)

Crop	Tigray N=100	Afar N=75	Somali N=75
Wheat	**72%**	9%	**88%**
Maize	5%	**64%**	**78%**
Sorghum	17%	3%	**89%**
Tef	**62%**	0%	0%
Onions	0%	**32%**	1%
Tomatoes	0%	**24%**	0%
Barley	20%	0%	4%
Common Beans	15%	1%	0%
Cotton	0%	15%	0%

Tigray

The diversity of crops in Tigray distinguished it from the Somali and Afar regions. FGDs in the four Tigray woredas revealed that farmers actively cultivate a wide range of crop species—from wheat and tef to sorghum, barley, beans, maize, faba beans, field pea, lentil, grass pea, flax, fenugreek, and *dekoko*—with choices largely influenced by agroecological variations. They consume and sell portions of their wheat, tef, field pea, lentil, barley, and *dekoko* harvests, while maize and sorghum are primarily used for household consumption, including brewing traditional beer.

In Tigray's SSSA areas, a notable shift has been made within the farming community: a considerable number of young farmers have redirected their efforts toward the development and utilization of irrigation water systems. This strategic move away from traditional rain-fed agriculture has enabled them to grow high-value vegetable crops, particularly onions, which are highly demanded both in local and regional markets. The availability of irrigation has not only improved the reliability of crop production but also extended the growing season, allowing farmers to cultivate two or even three crop cycles within a single year.

Box 1. Climate-adaptive agricultural practices in Tigray

Findings from the FGDs indicate that farmers' selection of crop types and varieties is closely linked to the specific characteristics of each growing season. For example, farmers in the lowland agroecological zone of Tigray explained that their crop choices are highly dependent on the timing and amount of rainfall. If adequate rainfall occurs in February and March, they typically plant a long-maturing sorghum variety known locally as *Aba'are*. However, if the rains begin between March and May, they use early-maturing sorghum cultivars such as Kodon and Wedi Arbea. If the rain comes even later, they shift to early-maturing or more adaptable tef varieties, such as Boset and *Bine.* Finally, if the rain is extremely delayed and only begins around August, farmers resort to planting chickpea, a crop better suited to very late planting conditions.

This adaptive approach illustrates how farmers in lowland areas utilize a diverse range of crops and varieties within the same crop to cope with seasonal variability and climate uncertainty. Other lowland farmers in Tigray reported that when they anticipate a light or erratic rainy season, they tend to plant barley, which is favored for its short growing period and strong drought-escaping ability, making it a strategic crop for unpredictable weather conditions. Similarly, farmers in the highlands utilize early-maturing wheat varieties such as King bird and Kekeba, which complete their life cycle more quickly than local landraces, thus reducing the risk of crop failure due to shortened rainfall periods.

Somali

In Somali, FGDs revealed that their priority crops include wheat, maize, sorghum, pulses, and oil crops. However, respondents indicated that agricultural land use is shifting towards an increase in cultivation of wheat followed by onion and tomato. Conversely, sorghum and maize cultivation in Somali is declining, attributed to the dual challenges of bird infestations and drought conditions. This transition likely reflects farmers adapting to environmental pressures and market demands, potentially impacting food security and economic stability.

Somali experiences two major rainy seasons. The first season is Belg season (Dra'na) from April to May. The crops sown during this season are sorghum and maize. The second season is Meher season (Kerea) from August to October. Crops sown in this season are wheat, barely, and chickpea.

In the Somali region, the three target woredas (Tuli Guled, Haroreys, and Owbare) are characterized by lowland agricultural systems. Tuli Guled and Haroreys woredas have low crop intensity and face severe drought risk, while Owbare has medium crop intensity and also faces severe drought risk.

Owbare woreda—in the Fafan zone of the Somali region—is among the woredas known for its crop production and productivity potential. Wheat, sorghum, maize, barley and chickpea are the major crops grown here. In the Upper Fafan parts of the Somali region, maize and sorghum were the major cereal crops grown by the farmers while wheat, barley, and oats were commonly grown cereals in Jigjiga Plain agroecology (Mahamed Dol Ateye et al, 2023). Increasingly frequent droughts have incited some farmers to shift from cereal crop production to vegetable production because some vegetables can mature even more quickly than drought-resistant cereals. Also, the price of cereal crops are often depressed (as low as Birr 3000 per quintal) due to the seasonality of markets and emergency food distributions.

Afar

Rural denizens of Afar were pastoralists historically, who are shifting toward agro-pastoralism and using irrigation water from Awash River. Their primary focus is to produce crops that are consumed at the household level and contribute to livestock feed. FGDs and household data revealed that maize has become the dominant crop in Afar, prized for its multifaceted benefits of food, nutrition, income generation, and vital crop residue for animal feed. In the past, sorghum was reported to be the primary preference. However, they shifted to maize due to plant diseases and pests that affected sorghum production. Currently, maize is facing similar problems, forcing many to consider alternative crops such as cotton, onion, tomato, mung bean, or shifting back to sorghum. Watermelon production has been gaining popularity due to its nutritional value, income potential, and comparatively low production costs.

Pests, wild animals, floods, and birds create challenges for farmers in Afar. Some of the pests are more prevalent during drought seasons and as a result of climate variabilities. For example, lack of rain creates favorable breeding ground for army worms and other crop pests that destroy maize and other cereals. Warthogs and apes destroy food crops, leading farmers to consider growing more cotton. Farmers complain that cotton is affected by pests such as bollworm and aphid. While wheat remains a major focus in Somali and Tigray, only 9% of the respondents in Afar grew wheat (see Table 5).

The transformation of agricultural practices in Afar presents a complex interplay of modernization, market forces, and the erosion of traditional food crops. The introduction of new crop varieties, while seemingly progressive, has precipitated the decline of historically significant crops—most notably sorghum, a traditional staple crop. This shift is largely attributable to high pest infestation and the expansion of irrigation infrastructure, which facilitates the cultivation of more marketable crops like maize and vegetables. The rapid transition of pastoral communities to crop farming has accelerated this trend, as new farmers often prioritize commercially viable crops over traditional ones.

The rise of tomato, mung beans, and other vegetable crops signals a move towards diversification and potential economic empowerment for farmers in Afar. The monetization of these crops, driven by market demand, further incentivizes the reduction of land dedicated to traditional cereals like maize and sorghum. This transition, however, is not without its challenges. Farmers face significant obstacles in accessing markets for their vegetable produce, primarily due to inadequate transportation and the escalating cost of fuel. This logistical bottleneck undermines the economic benefits of vegetable cultivation and poses a threat to the long-term sustainability of these new agricultural practices.

IV.1.c. Input Usage

Farmers' capacity and willingness to invest in their agricultural production also varies considerably across the three regions. While 80% of the respondents in Tigray purchased and applied some chemical fertilizer, only 3% of the respondents in Somali did so (see Table 6). The respondents in Tigray also demonstrated more advanced practices in modern compost preparation and utilization, relying primarily on crop residues and other plant species as its main source. These same tendencies occurred with pesticide use as well. Bridging the knowledge gap and addressing moisture limitations are crucial for expanding the benefits of composting across diverse agricultural landscapes.

Table 6. Application of soil amendments and pesticides in all three regions (n=250)

Region	Applied chemical fertilizer in 2024/25 season	Applied compost in 2024/25 season	Applied pesticides in 2024/25 season
Tigray (n=100)	80%	57%	78%
Afar (n=75)	47%	47%	52%
Somali (n=75)	3%	5%	13%
Total (n=250)	47%	38%	51%

IV.1.d. Postharvest Losses

Postharvest losses present a significant challenge to farmers in in all three regions, particularly in Afar and Somali. Weevils were identified as the primary culprits in storage pest infestations, affecting both highland and lowland areas. Their pervasive presence severely impacts farmers' ability to preserve crops and seeds for extended periods.

Traditional farmer storage practices in Somali (left) and Afar (right). Credit: Zerihun Abebe and Dawud Takele

Consequently, underground storage methods have become a common practice in some of these areas, particularly in the Somali region, for certain parts of the year. Some farmers also used storage chemicals to mitigate their postharvest losses (see Table 7), with more respondents in Tigray using storage chemicals and fewer farmers experiencing postharvest losses.

Table 7. Postharvest losses and use of storage chemicals in each region (n=250)

Region	Used storage chemicals in the 2024 offseason	Experienced postharvest losses in the 2024 offseason
Tigray	29%	19%
Somali	37%	36%
Afar	3%	43%

IV.1.e. Environmental Shocks and Stresses

Table 8 presents an overview of key environmental risks across the selected districts, categorized by region and agroecology. In general, agriculture and crop farming in the sampled woredas is subsistence, low-yielding, and low-input, mainly dictated by seasonal rainfall. In FGDs, farmers said that rainy seasons have become shorter in the last decade, posing a significant threat to crop farming and livestock production. Furthermore, elevated temperatures contribute to environmental warming, negatively impacting crop production.

Table 8. Key environmental risks in Tigray, Somali, and Afar

Region	Woreda	Agroecology	Crop intensity	Environmental risks			
				Drought	*Flood*	*Pests*	*Degradation*
Tigray	Dagua Tambien	highland	high	medium/sporadic	low	high	high
	Endamehoni	lowland	high	medium/sporadic	low	high	high
	Raya Azebo	lowland	high	medium/sporadic	low	high	high
	Alage	highland	high	medium/sporadic	low	high	high
Somali	Tuli Guled	lowland	low	severe	low	medium	low
	Haroreys	lowland	low	severe	low	medium	low
	Owbare	lowland	medium	severe	low	medium	low
Afar	Amibara	lowland	medium	medium	high	high	high
	Dubti	lowland	medium	medium	high	high	high
	Afambo	lowland	low	high	high	medium	high

Tigray

In Tigray, all four districts exhibit high crop intensity and are prone to pests and soil degradation. The drought risk is noted as medium/sporadic across these districts, with significant failure of crops due to variable seasonal rainfall patterns. However, the level and impact of the droughts is quite different in each district—for example, the annual rainfall and the intensity and frequency of pests in Degua Tambien and Alage woredas differ significantly.

Tigray has suffered profoundly from overlapping crises in recent years. A severe drought ravaged the eastern, southeastern, and southern zones, causing widespread crop failure, livestock deaths, and critical shortages of water and pasture. Simultaneously, the central, northwestern, and western zones experienced untimely, excessive rainfall during harvest, ruining mature crops and further compounding food insecurity. These climate shocks occurred amidst intense conflict, severely restricting humanitarian access and disrupting vital government services. Limited movement of goods, personnel, and resources hampered aid delivery, exacerbating the impact of the climate events and pushing communities toward famine-like conditions.

Afar

The Afar region's districts are also primarily lowland. Amibara and Dubti have medium crop intensity and face medium drought risk and high flood risk, while Afambo has low crop intensity and high drought risk.

Pests and soil degradation are significant concerns in Amibara and Dubti, whereas Afambo faces medium pest risk.

Somali

The Somali region's districts are also primarily lowland. Owbare has medium crop intensity, compared to low intensity in the other two districts. All three districts face severe drought risk; low flood and degradation risks; and medium pest risk.

IV.2. Social Context

IV.2.a. Conflict

Conflicts in the Tigray, Afar, and Somali regions stem from longstanding political, ethnic, and territorial tensions. The conflicts have severely impacted seed systems, agriculture, and the social and economic wellbeing of rural communities. Farmers in these three regions have faced widespread displacement and the destruction of crops, livestock, and equipment. Additionally, the destruction of infrastructure in all three regions—schools, hospitals, roads, and water systems—has exacerbated the humanitarian crisis.

Tigray

In Tigray, war erupted in November 2020 between the federal government and the Tigray People Liberation Front (TPLF), with additional involvement from Eritrean and regional forces worsening the destruction. A study on the effect of the war on smallholder agriculture in Tigray indicated that 94% of the households reported that at least one of their agricultural components (crop, livestock, and farm tools) was looted and/or destroyed during the war (Manaye, et al., 2023).

The conflict in Tigray significantly limited the availability of crucial agricultural supplies like agrochemicals, fertilizer, and high-quality seeds, due to blockades on transportation routes. In FGDs, farmers stated that the shortage of agro-chemicals has negatively impacted their ability to cultivate leguminous crops like faba bean, *dekoko*, and field pea, as they are often more vulnerable to pests. As a result, the area allocated to legumes has declined substantially. Improved varieties of leguminous crops could help address this problem, as they are often more resistant to pests, but there is lack of improved varieties in the target regions.

As of November 2022, a ceasefire holds in Tigray, and humanitarian aid is gradually helping to restore agriculture and seed systems, though political tensions remain

Afar and Somali

Pastoralist communities in Afar and Somali also suffered from violence and extensive asset depletion. Afar saw violent clashes with the Somali region over contested kebeles, trade corridors, and water resources. National elections reignited these tensions, driven by unresolved land disputes. Key informants shared contradicting accounts of the conflict in Somali. While some reported that the region is currently not experiencing conflict, an official in the Tuli Guled woreda reported intermittently erupting conflict between the Gari clan in Somali and the Jarso clan in Oromo.

Across all three regions, but mainly in Tigray, seed systems and agricultural supply chains have been heavily disrupted as a result of these conflicts. Agrodealers and nurseries were destroyed. With certified varieties out of reach, farmers relied primarily on informal markets, followed by saved seed. Shortages of improved crop varieties, coupled with rising prices of both improved seeds and fertilizers, pose significant challenges to farmers seeking to enhance productivity. These interconnected effects of conflict, dysfunctional supply chains, and a lack of innovative germplasm create a complex web of vulnerability, hindering development and exacerbating rural poverty. The conflict also weakens social structures and increases dependence on external aid, trapping communities in a cycle of poverty and vulnerability.

Box 2. A "wheat revolution" in Afar, with mixed results

Effective seed systems require institutional and financial support. In the last four years, wheat production has benefited from a national political will for this support, leading some key informants to call it the "wheat revolution." Government policies have strongly incentivized wheat production in Afar by providing farmers with improved wheat seed and fertilizer for wheat production. These much needed resources—plus the government's information campaign—convinced many farmers in Afar to switch to wheat production, with mixed results.

Their first season of wheat production in 2020 failed because of excessive rain around harvest time. Their second season, in 2021, was destroyed by birds. Since 2021, farmers in Afar have grown skeptical of wheat production and birds have remained a major pest problem. However, wheat remains a government priority crop. For instance, the Dubti Woreda has a 12,250-hectare quota for wheat production for the 2025/26 season.

IV.2.b. Gender

Gender Roles and Livelihoods in Tigray, Somali, and Afar

Women's involvement in agriculture in the three target regions is extensive, covering land preparation, planting, weeding, harvesting, and post-harvest processing. Beyond farming, women are active in petty trade, livestock production, and the sale of livestock, vegetables, agricultural residues, food products, and clothing. Women with more access to capital engage in the trade of larger animals.

In the women's focus groups, participants said that the role of men in income generation has declined in some communities—mainly in Afar and Somali regions—with many men spending significant time on leisure activities such as chewing khat. Respondents said that this has shifted a greater share of household income responsibility to women. In response to this increase in household responsibility, the women noted organizing more market-based activities such as milk sales, livestock fattening, and small-scale crop marketing. Women employ various coping strategies to overcome resource limitations. These include joining informal groups to pool resources for seed purchases, assisting each other with labor, and engaging in sharecropping arrangements. Additionally, they engage in market activities extending beyond crop sales: the production of cultural clothing, onion and pepper cultivation, and the sale of hay and crop residues. Women often control the income from these activities, although some report that husbands request and use these earnings.

Male and female farmers in the target regions generally cultivate the same staple crops, including tef, wheat, barley, pulses, and various vegetables. However, crop locations and purposes sometimes differ: women often plant onions, peppers, and other vegetables in home gardens near their households, primarily for food security and small-scale income generation. Male farmers tend to focus on cultivating larger fields, which

may be farther away from the home. Certain crops shift between male and female control depending on their commercialization. For example, tomatoes grown in backyard gardens are often considered “women’s crops,” but when production becomes commercially viable and labor-intensive, control tends to shift to men, including decision-making over revenues.

In male-headed households, the men typically play a leading role in deciding which crops to produce. Nevertheless women contribute valuable opinions and knowledge during these discussions. In polygamous households—mainly in Somali—some men have up to four wives. This makes resource allocation and labor sharing complex, with older women maintaining power and authority over younger women. The older women also have more/earlier access to household resources like plows and oxen.

Female-headed Households: Challenges and Coping Mechanisms

Traditionally, households are headed by men, with women playing a subordinated role. However, female-headed households also exist, mainly because of divorce or the death of the husband. These households face significant vulnerabilities, including limited agricultural labor, lack of financial resources, and heightened feelings of insecurity. Older or physically unwell women are particularly disadvantaged, often unable to cultivate their land effectively. In addition, female-headed households frequently lack livestock and other productive assets. When female-headed households do own livestock, they sometimes face challenges in managing livestock without male labor.

Labor constraints are especially acute during critical farming periods such as weeding, harvesting, and threshing. While occasional assistance may come from relatives or community members, it is often provided late, leading to delayed planting or harvesting and reduced yields. Consequently, many female-headed households enter into sharecropping or land-leasing arrangements, often receiving only half the harvest from their own land.

Access to mechanized farming, mainly in the Somali region, presents another barrier for female-headed households with fewer productive resources. Without oxen or tractors, women must rent equipment, which requires financial resources they often do not have. The lack of affordable credit compounds this problem. Collateral requirements, complex banking procedures, and high rates of female illiteracy prevent women from accessing formal banking systems.

In Tigray, the proportion of women-headed households has risen dramatically, reaching up to 60% in some of the studied kebeles such as Meswaeti in Endamehoni woreda. This sharp increase might be attributed to the recent conflict in the region, which has left many families without men or youth, profoundly altering household structures and placing the full burden of responsibility on women. These households remain highly vulnerable to economic hardships and family instability. Most of these households lack critical agricultural assets, such as oxen, which limits their ability to perform timely farming activities.

In all three regions, land ownership for women is rare and usually occurs only in the absence of male heirs or when a widow has no male children. Married women do not typically hold independent land rights while their husbands are alive. In Tigray, although challenges persist, there is growing recognition of women's rights to land ownership.

Nutrition, Cultural Practices, and Crop Preferences

In FGDs, women reported selecting crops for their nutritional value, thereby contributing to household dietary diversity, improved nutrition, and food security. Women appreciate pulses, red tef, and barley for

their high micronutrient content and role in improving dietary quality. Barley is valued for its early maturity, which helps meet urgent food needs, especially in female-headed households that are more prone to food insecurity. Barley is also culturally important for preparing foods such as porridge, a prominent food during childbirth and postpartum recovery. It is also important for preparing the well-known traditional food called *Tihilo* in Tigray. Fenugreek, which grows well in small plots near homes, is valued because it provides both nutritional benefits and income due to its high market price.

IV.3. Legal Context of the Seed Sector

Inclusive seed policies are crucial to the development of innovative and market-oriented seed systems. Ethiopia's 1992 seed policy—recently updated in 2023—guides seed laws and regulations, aiming to conserve plant genetics, enhance variety development, ensure quality seed supply, encourage farmer participation, create efficient organization, and regulate seed standards and trade.

Several proclamations have been issued to enforce Ethiopia's seed industry policies, including decrees and regulations concerning plant protection, quarantine, and seed management. These laws established a legal framework to protect seed actors' interests and designate government agencies to oversee seed production, processing, import/export, and distribution. Seed Law Proclamation No. 206/2000, updated by Proclamation No. 782/2013, addresses variety release, registration, seed production, quality control, import/export, emergency seed supply, and seed inspection. These measures aim to protect farmers' interests through official variety registration and quality controls while fostering fair competition among seed producers by preventing substandard seeds from entering the market.

Two more recent proclamations include Biosafety Proclamation No. 896/2015 and Plant Breeders' Right (PBR) Proclamation No. 1068/2017. These support the development of high-yielding and high-quality cultivars; the growth of innovative and competitive breeders; the recognition of farmers' rights to save, use, exchange, and sell protected varieties and farm-saved seed; the encouragement of foreign investment; and the offering of financial rewards and recognition to those who help create high-quality improved varieties.

Ethiopia's seed sector has undergone significant restructuring over the past few decades. Key actors were reconstituted into new legal entities, beginning with the Ethiopian Seed Enterprise (Proclamation No. 266/1982). This was followed by the National Seed Industry Agency (Proclamation No. 56/1993); the Ethiopian Institute of Agricultural Research (Proclamation No. 79/1997); the Institute of Biodiversity Conservation and Research (Proclamation No. 120/1998); the Oromia Agricultural Research Institute (Proclamation No. 44/2001); the Amhara Regional Agricultural Research Institute (Proclamation No. 48/2000); the South Agricultural Research Institute (Proclamation No. 37/2001); the Tigray Agricultural Research Institute (Proclamation 36/1999); the Somali Pastoral Agricultural Research Institute (Proclamation No. 31/2002); the Afar Pastoral Agro-pastoral Research Institute, APARI (Proclamation No. /2007); the Oromia Seed Enterprise (Regulation No. 108/2008; the Amhara Seed Enterprise (Regulation No. 66/2009); the South Seed Enterprise (established in/2010); the Tigray Seed Enterprise (Regulation No. 111/2020); the Afar Seed Enterprise and Somali Seed Enterprise (Regulation No. 108/2011). These institutions created a solid framework for seed production and distribution in Ethiopia.

The Ethiopian Standards Agency (ESA) introduced revised seed quality standards in 2012, concurrently with the formalization of a national seed sector strategy aimed at harmonizing sectoral objectives to ensure wider market outlets by meeting the minimum regional and international standards. The recognition of intellectual property rights culminated in 2017 with the first plant breeders' rights, incentivizing innovation and motivating

breeders and private sector actors to release high-yielding, drought-tolerant, and more widely adaptable varieties—potentially attracting international companies to invest in the seed sector of the country. Most recently, in 2021, the Ethiopian Agricultural Authority (EAA) was organized as a regulatory body to oversee seed quality and sector governance.

IV.4. Seed System Context (Formal, Intermediary, Informal)

IV.4.a. Formal Seed System

The formal seed sector plays a foundational role in driving agricultural productivity and supporting national development objectives. It operates as a structured system encompassing the entire seed value chain—from the development of improved crop varieties to their multiplication, certification, and distribution to farmers. This system depends on a network of institutions, including public research centers, national and regional seed enterprises, and private sector actors, all working to meet market demand for improved varieties and enable farmers to increase their yields and respond to evolving agronomic and environmental challenges.

The formal seed sector is organized around three core pillars: varietal development and release, seed production/multiplication, and seed marketing and distribution. Each pillar contains distinct processes and actors, all contributing to the sector's overall performance and impact.

Varietal development serves as the foundation of the formal system. Primarily led by national and regional public research institutions and universities, this process emphasizes the breeding of high-performing varieties, taking into account yield potential, resistance to pests and diseases, resource-use efficiency, and climate adaptability. Increasingly, traits related to the broader value chain—such as nutrition, biomass, and fiber quality—are being integrated into breeding objectives.

Before a variety is released for production, it must pass a rigorous evaluation process, including multi-location trials coordinated by variety release committees and overseen by national agricultural authorities such as the EAA. These evaluations assess agronomic performance and genotype characteristics through a series of advanced tests, including Value for Cultivation and Use (VCU); independent VCU; and Distinctness, Uniformity, and Stability (DUS) testing. Only varieties that meet all standards are approved for release.

Over the past two decades, Ethiopian plant breeding has evolved significantly to enhance food security and address climate change. The Ethiopian Institute of Agricultural Research (EIAR) coordinates national research, while universities train breeders and conduct basic research. The sector has shifted from conventional methods to incorporating biotechnology like molecular markers to develop crops with enhanced drought tolerance and pest resistance. Participatory plant breeding integrates farmers into the selection process, and updated seed legislation bolsters intellectual property rights. While EIAR leads crop improvement, collaborations with universities and international organizations have strengthened breeding efforts. Efforts to bolster research capacity of the EIAR and regional research institutes are proving significant, and policy and legislative reforms have also improved agricultural research and extension services.

Additionally, Ethiopia's plant breeding sector has advanced through institutional reforms, technology upgrades, and broader research efforts. Led by EIAR and supported by regional agricultural research institutes (RARIs) and universities, variety development and adaptation trials have expanded. However,

progress remains inadequate, especially in releasing new, climate-resilient varieties to meet growing agricultural demands. As of 2020, Ethiopia's National and regional research institutes had released 1,414 crop varieties. Cereals accounted for the largest share (34%), followed by pulses (17%) and oil crops (9%). However, there is a notable imbalance: only 8% of varieties are tailored for low-rainfall areas, while over 90% are designed for high-rainfall zones. This reflects a critical gap in varietal development for moisture-stressed and drought-prone regions.

Once new varieties are produced by Ethiopia's plant breeding sector, these varieties are produced and multiplied by Ethiopia's seed production sectors (see Table 9). This sector includes public seed enterprises, 373 cooperatives, and 84 private sector actors, with regional seed enterprises (RSEs) producing 75% of basic seed. The seed multiplication is dominated by four regional and national public seed enterprises: Oromia, Amhara, Ethiopia Business and Agricultural Corporation, and Southern Seed enterprises. Although 84 private seed producers are registered, their market share remains limited, and the range of varieties they offer is relatively narrow. The Somali and Afar seed enterprises also engage in production, though with mixed success, as they are at infant stage and with limited capacity. In Tigray, seed production was severely disrupted by the 2020-2022 conflict.

Despite its importance, the formal seed sector currently meets only 10–20% of the national seed demand, with a maximum annual production capacity of approximately 200,000 tons. Limited supply of basic seed hinders certified seed output, driving up prices and forcing many farmers to rely on low-quality local seeds. The gap between low breeding output and high demand for innovation underscores the urgent need for intensified research, institutional support, and widespread dissemination of climate-resilient crop varieties to strengthen food security and agricultural sustainability across diverse agroecological zones.

A formal seed demand reporting system is in place, cascading from farmers to the Federal Ministry of Agriculture (MoA). This system has revealed a significant gap between reported demand and actual supply, with reported demand outstripping supply by 4 times. However, this "reported demand" may not reflect subsistence farmers' actual willingness to pay higher prices for improved seed. This shortfall disproportionately affects lowland and conflict-affected regions, where farmers increasingly depend on NGOs or limited contributions from RSEs to access quality seed. Strengthening the formal seed sector will require investment in lowland varietal development, expanded private sector participation, improved coordination between supply and demand systems, and enhanced distribution mechanisms to ensure equitable access for all farming communities.

Table 9. Institutional Structure of the Formal Seed Structure

Seed system components	Involved stakeholders	Regulatory stakeholder	Regulatory measures
Plant breeding	EIAR, RARIs and Universities	Ministry of Agriculture (MoA)/EAA	Policy oversight, regulatory frameworks, certifications
Variety Evaluation	Internal by EIAR/RARIs, EAA	MoA/EAA	Seed quality assurance through testing for DUS, VCU for release if requested by the EAA
Variety Release	National Variety Release Committee	MoA/EAA	Checking all information submitted by variety evaluation committee and EAA and determining the release of varieties
Breeder seed Production	EIAR, RARIs and Universities	EAA/Regional Agricultural Input Regulatory	Seed quality control
Pre-basic seed Production	EIAR, RARIs, universities and Ethiopian Agricultural Business Corporation (EABC)	EAA/Regional Agricultural Input Regulatory	Seed quality control
Basic seed Production	ESE, private seed companies, and Unions	MoA	Seed quality Assurance
Certified seed production	ESE, RSEs, private seed farms, farmer-based seed production	MoA/Regional Bureaus of Agriculture (RBoA) and regulatory institutions, Agricultural Transformation Institute (ATI)	Seed quality Assurance
Farmer-based seed Production	ESE, RSE, RBoAs, NGOs and farmers, ATI, cooperatives	RBoA, ATI	Seed quality control
Seed demand planning	Extension workers/kebele, Woreda Office of Agriculture (WoA), Zonal Office of Agriculturee (ZoA), RBoA, MoA, seed enterprises	MoAR, RBoA, EAA	Volume and quality of seeds demanded by customers
Seed Supply planning	WoA (out growers, community-based seed producers [CBSP]), ESE, RSEs, Bureau of Agriculture (BoA) and MoA	MoA, RBoA, EAA	Quantity and quality of seeds available
Seed Price determination	ESE, RSEs, cooperatives, out-growers, private sector producers		Seed prices
Seed distribution and sales	ESE, RSEs, cooperatives, RBoAs, Woreda agriculture offices	RBoA, MoA, EAA	Price, quantity to respective Buyers

Regional Agricultural Research Institutes (RARIs)

RARIs play a crucial role in plant breeding and the production of early generation seeds (EGS). These institutes collaborate with the EIAR and international research organizations to generate basic and pre-basic seeds. The Plant Quarantine and Regulation Directorate within the Bureau of Agriculture oversees seed quality control, ensuring compliance with national standards. The capacity of these regional institutes in the formal seed sector varies across different regions, presenting a challenge to the overall effectiveness of the plant breeding program.

Tigray

Tigray Agricultural Research Institute (TARI) was formally established in 1999 through Proclamation No. 36/1991. TARI functions through 11 research centers strategically located throughout the Tigray region, enabling the implementation of targeted, region-specific research initiatives. TARI operates a comprehensive, multi-tiered approach that integrates modern breeding techniques, participatory research, and the utilization of both indigenous and improved genetic resources.

Among the 11 research centers, six centers focus on crop research, each specializing in key commodities that are vital to local food security and rural livelihoods. This decentralized structure allows TARI to effectively respond to the unique agricultural challenges present in various agro-ecological zones. By placing research activities near farming communities, TARI ensures its innovations are relevant, accessible, and practical, thereby promoting more adaptive, inclusive, and sustainable agricultural development across the region (see Table 10).

Table 10. Varieties TARI has released

Crops	Varieties released	Date of release	Woreda/region	Traits
Wheat	Mekelle-1	2011	Eastern and Southeastern zones	Suitable to low rainfall areas, early maturing
	Mekelle-2	2011		
	Mekelle-5	2024		
	Mekelle-3	2012	Southern zone	High yielder, suitable to relatively high rainfall areas
	Mekelle-4	2013		
	Hadis	2018		
	Korem-1	2019		
Tef	Axumawit	2020	Central zone	Suitable to high rainfall area
	Maytium	2024		
Faba bean	Hashenge	2015	Southern zone	Orobranchia resistant
	Mugulat-1	2017	Eastern zone	Moderately resistant to Chocolate spot
Chickpea	Hatsebo	2024	Central zone	Higher yield
Dekoko	Raya-1	2015	Southern zone	Early maturing
	Raya-2	2015		
Barley	Illala-1	2016	Eastern and Southeastern zones	Early maturing
	Illala-2	2016		

Crops	Varieties released	Date of release	Woreda/region	Traits
Finger millet	Mereb-1	2016	Central zone	Early maturing and higher yield
	Tekeze-1	2018	Northwestern zone	Better resistant to head blast disease
Rice	Mytsebri-1	2014	Northwestern zone	Better yield and resistant disease and pest
	Mytsebri-2	2016		
	Mytsebri-3	2018		
Sesame	Setit-1	2011	Western and Northwestern zones	Better resistant to diseases and yield
	Setit-2	2016		
	Setit-3	2017		
	Humera-1	2011		
Okra	Bamya-1	2016	Western zone	Relatively higher yield
Tomato	Tekeze	2015	Western zone	Relatively higher yield
Mung bean	Arkebe	2014	Low land areas	Early maturing
Lettuce	Tesfa/Maya	2017	Across Tigray	Slow blotting
Cumin	Mikrti	2024	Mekelle zuria	
Sunflower	Humereyti	2024	Western and northwestern zones	Better yield

In addition to its efforts in releasing new crop varieties and promoting improved management practices, TARI also conducts adaptation trials. These trials assess the performance of crop varieties developed by other research centers within Ethiopia and those released internationally, with the goal of identifying varieties that are well suited to the local agro-ecological contexts. Furthermore, TARI actively engages in collaborative research projects with national and international partners, including universities and research institutions. The institute—through its research centers—has conducted adaptation trials for nationally released varieties of major crops (see Table 11). As a result, several varieties have been identified as well-suited for cultivation in many parts of Tigray.

Table 11. Varieties TARI has adapted to Tigray farmer preferences

Crop	Varieties
Wheat	Daka, Boru, Abay, Wane, King Bird, and Kekeba
Sorghum	Melkam, Dekeba, Girana-1, and the ESH series
Maize	Melkassa 2, 4, and 6, Quality Protein Maize and the BH-series hybrid varieties
Chickpea	Arerti and Dalota
Faba bean	Dosha and Numan
Tef	Quincho, Dagim, Kora, and Nigus

Mekelle University is another institution engaged in breeding new varieties in Tigray. Its College of Dryland Agriculture and Natural Resources plays a pivotal role in advancing crop research and breeding, especially for semi-arid regions. Key focus areas include research on crops like sorghum, tef, and finger millet through its Dryland Crop Research program, and experiments on conservation agriculture. The university recently

released two cactus varieties (X-05/PARL 262 and X-11) resistant to Cochineal insect pests and one early-maturing Barley variety (Hidat) that is more drought-tolerance, making it potentially suitable for dryland farming across Ethiopia.

Somali

The Somali Regional Livestock and Agricultural Research Institute (SoRLARI) and the Somali Regional Seed Enterprise (SoRSE) play distinct but crucial roles in developing and producing crop seeds within the Somali region. SoRLARI primarily focuses on research and development, tailoring crop varieties to the specific environmental conditions and needs of the pastoral and agro-pastoral communities. This involves conducting trials, evaluating introduced germplasm, and breeding new varieties that exhibit desirable traits such as drought resistance, disease tolerance, and improved yield (see Table 12).

Table 12. Adapted varieties that were recommended by SoRLARI for major crops in Somali

Crop	Number of varieties	Name of Varieties
Rice	9	Shabelle, Gode-1, Hoden, NERICA-1, NERICA-2, Kellafo-1, NERICA-14, NERICA-6, NERICA-15
Wheat	14	Pavon 76, Hawi (Har-2501), Simba (Har-2536) Kubsa (Har-1685), Kingbird, ABAY, Shaki, Amibera, Fentale, Hidase, Danda'a, Kakaba, Qulqulluu and Dure.
Sorghum	17	Teshale, Gambela-1107, Seredo(3443-2-op), Meko-1(M-36121), Melakam, AYINAGE, Erer, Elemo, Fadis 01, ESH-5, Mentebteb, Jiru, Fendisha-1, Chellenko, Gubiye, ABSHIR and Chiro
Maize	17	ACV-3, ACV-6, Melkasa-2, Melkassa-4, Tola, Meta, Shankur, Blen, Kortu, Afran Qallo, Baate, Damote, Melkassa-1Q, Mekassa-6Q, Melkasa-3, Raare-1 and Melkassa-1.
Common bean	19	Awash melka, Awash-1, Ayenew, Duromsa, Herege, Bontu, Haro Sabu-1, Derash, Tafach, Remeda, Tatu, Ada, Dandesu, Awash-2, Fedis, Babile, Hundane, Hirna, and Naser
Soy bean	9	Guda, Pawe-78, Gute, Andinet, Pawe 03, Jalale, Cheri and Coke 240.
Cowpea	4	Bole (85D-3517-2), Kechene, Keti and Asrat.
Sesame	7	Kelafo-74(BSC-003), Tate (BSC-003), S-Variety, Mahado-80, Barsan Adi and Iidan
Ground nut	3	BULKI, Lote and Roba
Tomato	3	Melkashola, Roma-VF and Marglobe
Onion	4	Bambay-red, Adama-red, Red-creole and Nasic red
Sweet Potato	4	Awassa- 83, Kulfo, Hawassa-09 and NASpot-12
Banana	2	Willium and Garade
Mango	3	Apple, Kent and Tommy
Livestock Feed	9	Buffel grass, Rhodes grass, Panicum maximum L., Panicum antidotale L., Sudan grass, Cowpea small, Cowpea large and Alfalfa

The research also encompasses developing appropriate agronomic practices to optimize seed performance. From 2020–2024, the SoRLARI multiplied 2,400 metric tons of breeder, basic, and pre-basic seed for germplasm maintenance and production of certified seeds. Moreover, the institute has conducted adaptation trials and proved the performance of each crop variety in the region.

Afar

The Afar Pastoral and Agro-pastoral Research Institute (APARI) is the primary research institution in Afar, mandated to conduct research on crops and livestock relevant to the Afar region's agro-ecological conditions. While not directly involved in large-scale seed production, APARI plays a vital role in crop variety screening, adaptation trials, and pre-basic seed multiplication. It identifies and evaluates promising crop varieties suitable for the harsh climate, focusing on drought tolerance, heat resistance, and pest/disease resistance. It also conducts research on improved agronomic practices to maximize crop yields in the region.

APARI's role is predominantly focused on upstream research and development, acting as the engine for innovation in crop production. However, its capacity to develop new varieties and to conduct adaptation trials is limited due to challenges such as frequent drought and lack of access to irrigation facilities and human resources. Its engagement in production and supply of early generation seeds is also at an infant stage.

Seed Multiplication within the Formal Seed System

Each of the three regions has a seed enterprise: the Tigray Seed Enterprise (TSE), the Somali Region Seed Enterprise (SoRSE), and the Afar Seed Enterprise (ASE). These regional seed enterprises (RSEs) are mandated to multiply and distribute certified seeds of improved varieties to the farmers in their regions. Both the RSEs and EABC obtain basic seed and pre-basic seeds from regional and national research institutes as well as from a few universities. The RSEs use pre-basic and basic seed to produce basic seed and certified seed respectively, and distribute to seed producer cooperatives, seed unions, private seed producers, and farmers (for certified seed). Unions with Primary Seed Producer Cooperatives (SPCs) through contractual agreements, and private seed producers use the basic seed to produce certified seed under the supervision of the internal quality control system in Tigray, and the RSEs—particularly in Somali—and then sell these raw seeds back to the RSEs (often at a 3% higher price than the prevailing price of grain), which will be further processed and certified by Somali Seed Enterprise. Read more about the role of SPCs in Section IV.4.b Intermediary Seed System.

Tigray

The Tigray region has a more organized seed production system than Afar and Somali regions. Seed production in Tigray is carried out by a combination of actors, including private seed producers, seed unions, and the two major federal and regional seed enterprises operating in Tigray: TSE and the Ethiopian Seed Enterprise, which now operates under the Ethiopian Agricultural Business Corporation (EABC). Unfortunately, the establishment of TSE coincided with the outbreak of a devastating war in the region in 2020, which significantly hindered its progress. The war's impact on infrastructure, human resources, and seed stocks has severely curtailed TSE’s ability to meet the region's demand for improved seed. Its capacity to produce, collect, clean, grade, package, and market seed remains limited.

Table 13 presents data on the production of basic and pre-basic seeds by various institutions in the Tigray region in 2020 (the onset of the conflict) and 2024. It shows the quantities produced by key seed producing institutions in the region, including the Hadinet Raya Union, the Me’bale Union, the Ethiopian Agricultural

Business Corporation (EABC), Desta Berhe, Tigray Agricultural Research Institute (TARI), and TSE. The table shows declines in seed production across most crops from 2020 to 2024. The total seed production volume decreased from approximately 1,020 metric tons in 2020 to 757 metric tons in 2024. This overall decrease shows the disruptive effects of the conflict on agricultural infrastructure, supply chains, and institutional operations within the region. Rehabilitating seed production capacities and ensuring institutional resilience will be critical for the region's agricultural revival and long-term stability.

Table 13. Seed Production by Crop, Variety, and Producer (in metric tons)

Crops	No. of varieties	Hadinet Raya Union		Me'bale Union		EABC		Desta Berhe		TARI	
		2020	*2024*	*2020*	*2024*	*2020*	*2024*	*2020*	*2024*	*2020*	*2024*
Wheat	10	353	386	43	37	217	71			2	6
Tef	5		30	48	178	13		193			1
Sorghum	3					66	9	9		23	5
Maize	2						12				1
Sesame	4						12	45		3	
Barley	2									1	1
Chickpea	1						2				
Mung bean	2									4	0
Faba bean	3										6
Total	32	353	416	91	215	296	106	247	0	33	20

Two seed unions, Hadinet Raya and Me'bale, along with several seed producer cooperatives, are especially active in the production and distribution of basic and certified seed in Tigray. The seed producers' cooperatives that participate in the Hadinet Raya Seed Producing and Marketing Union through a contractual agreement cultivate a total 2,737 hectares for seed production, and collectively have access to 5,000 hectares (see Table 14 for an overview of seed producer groups for which data was captured).

Relative to other regions, the seed production system in Tigray is a robust network connecting individual producers, cooperatives, and seed unions. Via these networks, individual producers gain access to technical support, inspection services, certification, and markets. These structures have been strengthened through diverse institutional support, including financial aid, infrastructure, equipment, and technical training. As such, they are relatively more reliable at supplying quality seed to small-scale producers.

Nevertheless, insufficient access to essential inputs like fertilizers and agrochemicals at affordable prices significantly impedes the seed production of individual seed producers. The high cost of these inputs can deter farmers, especially those with limited resources, from adopting best practices, thus impacting the quality and quantity of seed production. Inadequate access to agricultural machinery, including tractors, harvesters, and threshers, presents another considerable challenge. The reliance on manual labor or outdated equipment can reduce efficiency and increase post-harvest losses, affecting the viability of seed production enterprises. Due to low levels of seed production in Tigray, particularly wheat, tef and maize, NGOs and the government obtain improved seed from other regions in years when they conduct larger

distributions of improved seed. The underperformance of the regional seed system has critically impacted the financial stability of the Unions. Sustained investment in local seed producers is crucial for building operational capacity and ensuring their contribution to the region's formal seed system.

Despite the organizational and technical successes of the seed producers' cooperatives and unions, there is no functional market demand for their seed at the community level. NGOs and the government purchase their seed for direct distribution to the farmers, bypassing the local formal seed market, and this practice has only increased since 2020 as part of the humanitarian response to the conflict. **While this may provide short-term relief, it has suppressed farmers' willingness to buy improved seed and created a culture of dependency.** This has also led to large quantities of unsold carry-over seed in some years, negatively impacting seed quality and disrupting future production cycles. These constraints severely limit the unions' abilities to effectively carry out essential functions, including the maintenance of seed cleaning machinery, laboratory equipment, and other critical infrastructure required for quality seed processing and certification.

Somali

In the Somali region, the production of basic and/or certified seed is primarily conducted by SoRLARI and the Somali Regional Seed Enterprise (SoRSE). The source of basic seeds are from SoRLARI, Melkasa Research Center, and EABC, which they use to produce certified seed. Primary cooperatives in the region use this basic seed to produce 'certified seed,' but the certified seeds are mainly produced by SoRSE. SoRSE has contributed significantly to certified seed production in the region, reporting an annual multiplication of 24,000 metric tons between 2000 and 2024. SoRSE produces seeds of diverse crops, including cereals, pulses, sesame, oil crops, forage crops, root, vegetable, and fruit crops. SoRSE manages two storage facilities for seed cleaning, grading, and packaging, ensuring distribution to farmers.

Seed certification at SoRSE is conducted internally. SoRSE follows up with field inspections and verifies seed quality based on generalized national standards, using germination tests (>90%) and moisture content (12.5%) as the primary quality assessment methods. An independent seed quality regulatory body has recently been established in Somali, but it does not have a laboratory so it is not yet operational.

The major crops distributed through the formal seed system in Somali Region are wheat and maize, and occasionally sorghum. Farmers obtain this seed via direct distributions through their woreda or regional agricultural bureaus, cooperatives, or NGOs. The farmers generally do not pay for improved seed; the role of the private sector in formal seed systems in Somali is nearly non-existent.

Afar

In Afar, seed multiplication efforts are led by ASE. ASE possesses 500 hectares in Dubti and initially planned to allocate 400 hectares for wheat cultivation and 100 hectares for maize. They started multiplication of basic and pre-basic seeds of various crops in 2023, but failed to produce seed in the first year due to devastating drought, pests, and diseases. During the 2023/24 planting season, ASE cultivated 170 hectares of wheat and 80 hectares of maize. They were able to produce 140 metric tons of wheat seed from 100 hectares. They were less successful with maize production, producing only 14 metric tons from 9 hectares. Of the 154 metric tons of wheat and maize seed that they produced in the 2023/24 season, they distributed only 8 metric tons. The remaining 146 metric tons failed to meet seed quality standards and were sold as grain. In the 2024/25 season they increased wheat production from 170 hectares to 250 hectares, but only 130 hectares were successfully harvested, yielding 160 metric tons. A substantial portion of the

crop was lost to bird predation and fungal diseases. At the time of data collection, this wheat seed was awaiting transport to Qulumsa for cleaning and packing before being returned to Samara for distribution to local farmers. This logistical process highlights the complexities and potential delays inherent in the seed production and distribution chain.

ASE aims to expand its seed development program to encompass 10,000 hectares, envisioning a future where it supplies seed for all essential crops within the region. However, at present the region's formal seed sector is dependent on seed from other regions and NGOs. ASE must address issues such as bird predation, fungal diseases, and the establishment of internal seed regulations to ensure the quality and quantity of future yields.

Summary of Seed Multipliers

Seed enterprises face significant hurdles that impede their growth and sustainability. Heavy reliance on rented tractors and machinery increases costs and restricts flexibility, while limited access to finance prevents investment in cleaning, packaging, and storage equipment. Weak technical capacity among seed producers affects seed quality and overall productivity, and biological factors like birds and diseases reduce seed yields. The absence of robust seed regulation further compromises quality control. Finally, inadequate storage facilities lead to post-harvest losses, diminishing the overall yield and profitability of the seed enterprises.

IV.4.b Intermediary Seed System

Intermediary seed systems—those that blend elements of both formal and informal seed systems—play a vital role in improving smallholder farmers' access to quality seed. In Ethiopia, these hybrid systems have gained increasing attention as a practical means of expanding seed availability, particularly in areas underserved by the formal sector. Supported by organizations such as the Agricultural Transformation Institute (ATI) and international research partners, intermediary systems aim to enhance agricultural productivity and food security by promoting the distribution of climate-resilient and locally-adapted varieties.

These systems are primarily anchored by seed producer cooperatives, cooperative unions, organized community seed producer groups, and out-grower schemes. While they have grown in recent years, their overall contribution to the national seed system remains limited—not more than 20%. Nonetheless, they offer significant potential to bridge the gap between large-scale commercial operations and traditional farmer-saved seed practices.

Primary Seed Producer Cooperatives

The primary SPCs aggregate seed from individual seed producer farmers and sell to a seed union under contractual agreements in Tigray region and to SoRSE in Somali region. The seed producer cooperatives in Tigray region are comprised of individual members, whose fields are clustered together in order to meet the minimum 10-hectare area for seed production. The cooperatives obtain basic seed from the unions, research institutes, universities, and development programs, and they distribute it to their individual members. Upon harvest, the individual producers' seed is temporarily stored at the cooperative. A pricing team, including union experts, producer representatives, the Bureau of Agriculture, and regional seed regulators, assesses the seed's market value over two days. The cooperative then purchases the seed from members at the agreed price, storing it for subsequent marketing to the seed union.

Tigray

Of the 80 seed cooperatives that are officially registered in Tigray, 35 are currently active. The seed producers cooperatives in Tigray that were interviewed for this SSSA produced 489 metric tons of cereal seeds in the 2024/2025 season, including tef, maize, and wheat. They produced improved varieties of wheat (Boru, King Bird and Daka), tef (Bosset and Kora), and maize (Malkasa II). Some cooperatives (such as Brhan Ayba, Embeba Atsela, and Hiryti Mekan) maintain offices and storage facilities, while many others lack adequate infrastructure. The Brhan Ayba cooperative possesses a seed cleaning machine, but its installation is pending due to power issues and conflict-related damage. Critically, essential seed cleaning and handling equipment, including drying racks, and packaging tools, remain absent across all cooperative groups, hindering optimal seed processing and quality control.

Table 14. Overview of Seed Producer Groups in Tigray

Name of seed producer group	Location	Year of establishment	Number of members		Total area (ha)	Major crop
			Female	*Male*		
Tinquish	Raya Azebo	2022	92	12	30	Tef, sorghum
Hiryti Mekan	Endamekoni	2010	520	250	528	Wheat
Embeba Atsela	Alage	2010	271	60	221	Wheat
Birhan Ayba	Alage	2010	429	93	130.5	Wheat
Mayayni	D/Tembien	2017	85	21	30	Wheat, tef
Limat	D/Tembien	2015	240	88	50	Wheat, tef

To maintain seed quality, all seed-producing cooperatives in Tigray have established internal quality control committees that inspect fields to ensure compliance with seed quality standards at the field level. In addition, cooperatives that are members of a seed union receive further oversight from union agronomists, who conduct field inspections at various crop growth stages. If field performance is found to be below the required standards for seed production, the internal committee has the authority to reject the field. Such decisions are automatically accepted and approved by the Regional Seed Regulatory Directorate, reinforcing the integrity of the quality control process. Externally, the Regional Seed Regulatory Directorate conducts both field and post-harvest quality inspections. Field inspections are carried out twice, once during the vegetative stage and again at crop maturity. Post-harvest quality testing is conducted in a laboratory, where samples from each seed lot undergo rigorous analysis to ensure they meet established quality standards. Ultimately, seed production by any cooperative or affiliated union is only officially accepted once the Regulatory Directorate has verified and approved its quality.

Somali

The cooperatives in Somali receive basic seed, primarily wheat, from SoRSE. They cultivate these seeds on communal plots, adhering to recommended agronomic practices under the supervision of SoRSE's agronomists. Upon harvest, the cooperatives sell the raw and uncertified seed to the SoRSE for a price that is 3% higher than the market price of grain, and SSE further processes and internally certifies the seed. This community-based seed production scheme offers several advantages. It encourages agro-pastoralists to focus on farming, improves access to well-suited crops, and provides farmers with a diverse range of seed products that may be less profitable for larger enterprises. The seed cooperatives have the potential to

reduce costs of seed production and transportation, promote the adoption of new crop varieties through demonstration, enhance the timeliness of seed delivery via alternative channels, and directly support farmers in generating more income. Compared to Tigray, seed producers in the Somali region experience weaker institutional arrangements and governances, resulting in underperforming and inexperienced seed producer groups and limited mechanization.

The SSSA research team interviewed leaders of the Rajo and Iftin cooperatives in Somali. Rajo, established in the Tulli Gulid district in 2020, has 28 members (18 male, 10 female) and cultivates 12 hectares. In the 2024/25 season, the Rajo cooperative produced 31,000 kilograms (kg) of seeds, including wheat (Kingbird, Kekeba, Kubsa, and Pavan varieties), maize, and sorghum. Wheat varieties accounted for 20,000 kgs of the total production. Iftin, formed in the Haroreys district in 2017, has 11 members (one female) and manages 60 hectares of seed production. Unfortunately, production performance data for Iftin cooperative was not available.

Afar

The SSSA research team interviewed the leaders of two seed producers' groups in Afar: Alasa Bollo and Coma Gidaro. The Alasa Bollo seed producers' group, established in 2019 with support from the Worer Research Center and Samara University, initially comprised 14 farmers focused on maize seed multiplication. Despite increasing annual production from 78 to 90 metric tons (of the Melkasa II variety), the group faces challenges due to weak organization, unregulated practices, and the cessation of university support. As a result, they have lost access to basic seed and they now use their own saved seeds. Similarly, the Coma Gidaro Seed Producer's Group—formed in 2022, comprised of 40 male farmers, and supported by the Worer Research Center and International Maize and Wheat Improvement Center [CIMMYT])—experienced consecutive crop failures in wheat seed production due to a lack of combine harvesters, untimely rainfall, and bird damage. These failures, coupled with unfulfilled purchase agreements and unsuccessful compensation requests, have led the group to consider switching to tef seed production or returning to cotton cultivation. Both cases highlight the critical need for sustained organizational, training, and post-harvest support to enhance productivity and resilience among subsistence farming groups.

Challenges

Seed cooperatives struggle to meet demand for improved seeds. Bird and pest infestations, erratic rainfall, limited access to basic seeds and extension services, capacity limitations, and insufficient technical and management support hinder their ability to operate effectively—particularly in the Afar and Somali regions. Internal management challenges further exacerbate these issues, resulting in a constrained supply of improved seed varieties that negatively impacts agricultural production, farmer incomes, and overall livelihoods in their respective regions.

In all seed-producing cooperatives, decisions regarding which crops and varieties to multiply are made collectively by cooperative members. The cooperative board gathers information on the availability, class, and quantity of seed sources, which is then presented to the general assembly for discussion and decision-making. Cooperative leaders noted that, before the conflict, they had the opportunity to visit demonstration plots at various experimental fields across the region. These visits played a significant role in informing decisions about which varieties to plant. Due to the conflicts and blockage of border and transportation during the war, however, they were unable to participate in demonstration trials, which has negatively impacted the quality of decision-making. For example, in the case of the Tinquish Seed Cooperative, a decision was made solely based on the availability of source seed. It was only after production that they

realized there was no market demand for the chosen variety. However, post-war, many NGOs, regional research institutes, and seed enterprises started supporting variety portfolio demonstration trials that could help the cooperative leader make appropriate variety choice decisions for quality seed production and supplies.

Despite their potential, several challenges hinder the effectiveness of intermediary seed systems. In terms of supply, seed producers operating in the intermediary system lack consistent access to basic seed from which they can produce quality seed, especially in remote and rural areas. In terms of demand, many farmers still lack sufficient awareness of the benefits of improved seed. In some areas, particularly in Oromia, community-based seed production models supported through formal contracts and cluster farming arrangements have shown encouraging results. These approaches empower local producers, promote local adaptation, and strengthen seed supply chains. However, their scalability is constrained by climate-related disruptions, limited irrigation infrastructure, and inconsistent support services.

To unlock the full potential of intermediary seed systems, targeted investment is needed in farmer education, infrastructure development, and institutional support. Strengthening these systems will be essential for building a more inclusive and climate-resilient seed sector that serves all regions of Ethiopia effectively.

IV.4.c Informal Seed System

The informal seed system in Ethiopia is still the primary source of seeds for smallholder farmers. Nationally, it covers about 80-90% of the total demand, relying on farmer-saved, exchanged, and locally-purchased seeds, largely operating outside of government regulation. Key actors include individual farmers, farmer groups, local traders, and some NGOs using diverse exchange mechanisms at the community level. This traditional, decentralized system provides a wide diversity of crop varieties through local networks.

The informal seed system is crucial because smallholder farmers, in general, require relatively small quantities of seed. Even in remote areas, where there is little infrastructure or private sector engagement, the informal sector supports marginalized farmers—who may not have the financial resources to access improved varieties of quality seeds—to access the locally-adapted seeds they need.

The informal seed system is the primary source of seed in the Tigray, Somali, and Afar regions, accounting for 85-95% of seed demand, since the formal seed system is at infant stages. In Tigray, prior to the recent conflict, the informal system appeared more robust, with relatively stronger seed social networks, the establishment of Community Seed Banks (CSB), and informal farmers' groups of seed producers. However, saving seeds from own harvests has been deteriorating due to chronic food insecurity, poverty, and disruption of seed value chains. The Somali and Afar regions face similar challenges due to frequent droughts, high postharvest losses, unpredictable rainfall, and limited experience in seed saving.

Local market as a source of potential seed. Credit: Nugus Kassa

The informal seed system, while crucial for fostering adaptability to local conditions and meeting the specific needs of farmers, often struggles to provide farmers with a consistent supply of improved varieties of quality seeds. Many farmers

procure their seed from local markets, purchasing from grain suppliers who often fail to effectively differentiate between seed (or separated grain that is intended as potential seed) intended for sowing and grains destined for consumption. Farmers typically base their purchasing decisions on empirical observations, assessing physical characteristics such as grain size, color, texture, and the absence of pest infestations. In instances where traders do distinguish between seed (or potential seed) for sowing and grains for food, the cost of seed is substantially higher than that of grain.

V. SSSA Field Observations

The data for this SSSA was collected in May of 2025. At this time, the farmers were obtaining seed from their various sources and preparing to plant for the 2025/26 season.

An SSSA focuses on two core themes. It analyses the **short-term, acute seed security situation** for the 2024/25 main season and the 2025/26 season. Additionally, it considers **medium-term trends**, including chronic seed security issues and development opportunities.

V.1. Acute Seed Security Findings

The SSSA examined how and where farmers obtained seed for the 2024/25 season, whether they planted their usual amounts during the previous season (2024/25), and how they viewed their seed security for 2025/26. Analyzing multiple seasons is essential to gauge the stability and resilience of seed systems.

This section presents findings from all three regions, treated as a single unit where data aligned, and separately where significant differences emerged.

V.1.a. Main Crops and Seed Sources

Figures 2, 3, and 4 show the main crops and the sources of seed that survey farmers used during the 2024/25 agricultural campaign, by region. For a crop to appear in these figures, it had to be grown by at least 15% of the respondents in that region. This data is presented by region because there are significant differences between the regions.

However, one startling similarity among the three regions is the **lack of reliance on social networks**. In other SSSAs on the African continent, farmers often obtain roughly 10-20% of their seed from friends, family, and neighbors: for example, 13% in Southeast Kasaï and Kasaï-Central Provinces, Democratic Republic of the Congo (ADRA et al., 2025) and 21% in Southeast Madagascar (ADRA, 2023). In Tigray, Afar, and Somali, however, the survey data indicates that farmers obtain less than 1% from friends, family, and neighbors. In Afar and Somali, this is due to technical gaps and high risks of post-harvest losses, which results in farmers buying annually from local markets. In Tigray, war and conflict has led to the breakdown of social ties and civil society, reducing farmers' reliance on their social networks for seed.

Unlike other African countries, farmers in Tigray, Somali, and Afar do not rely as readily on their social networks for their seeds.

Figure 2 shows that the surveyed farmers in Tigray cultivated a number of crops and obtained seeds from diverse sources. They relied heavily on their saved stocks for all of their main crops, and community-based seed groups provided them with access to bean and wheat seeds. For example, the community-based seed groups—particulary community seed banks—provide seeds for the farmers through loan mechanisms, even during the war. The local markets also featured prominently among their seed sources.

Figure 2. Farmers' seed sources for Tigray, 2024/25 (n=100), organized by source

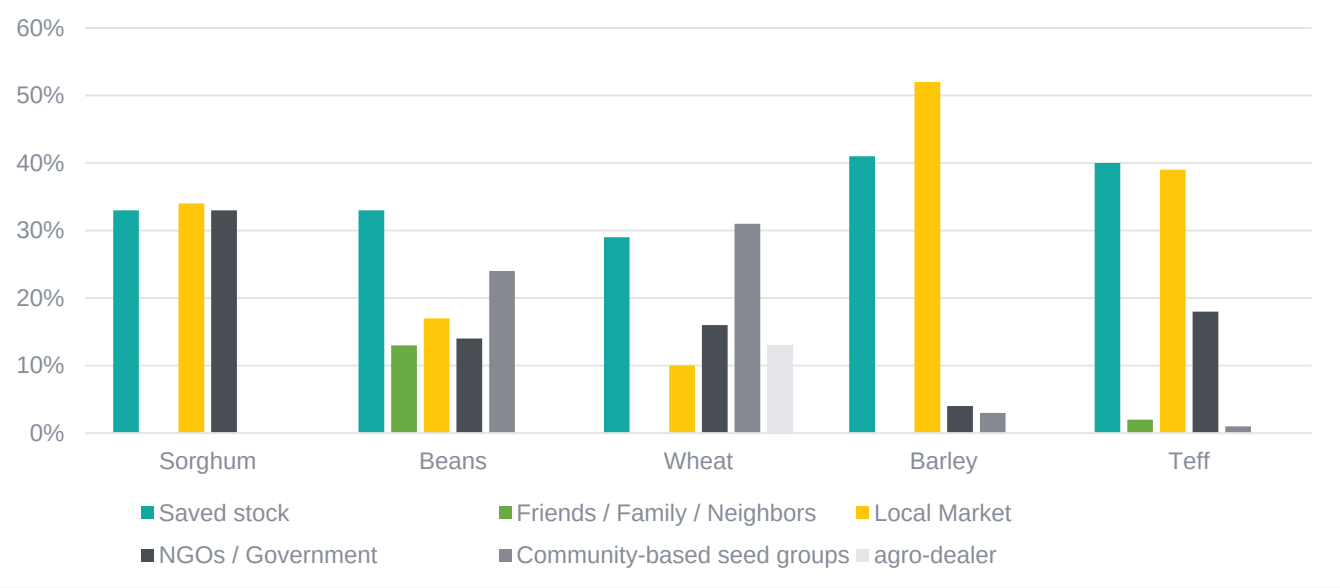
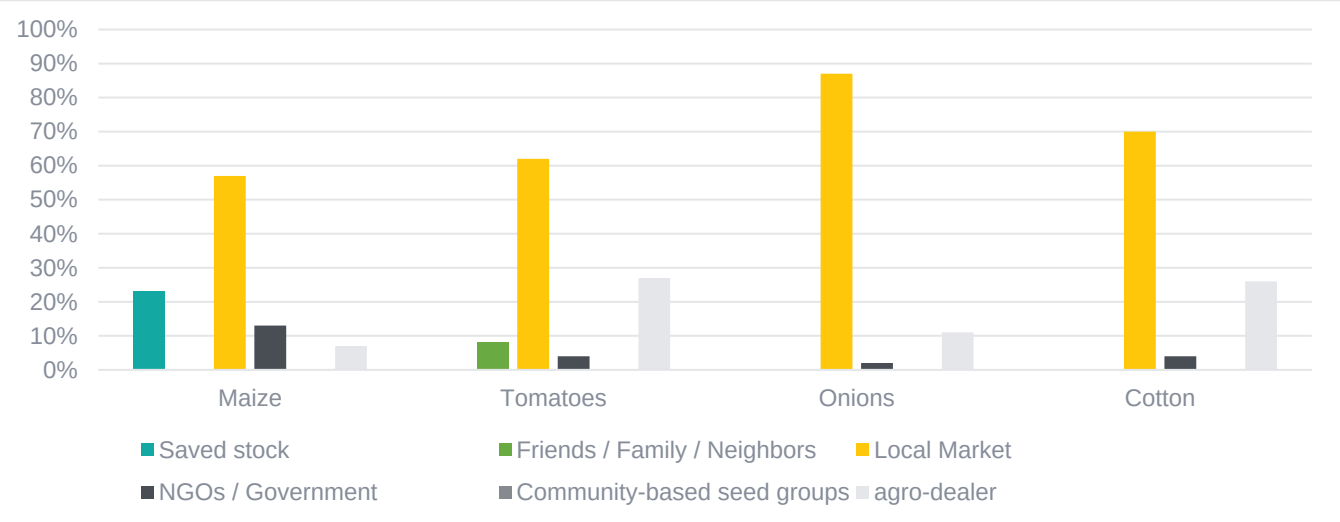


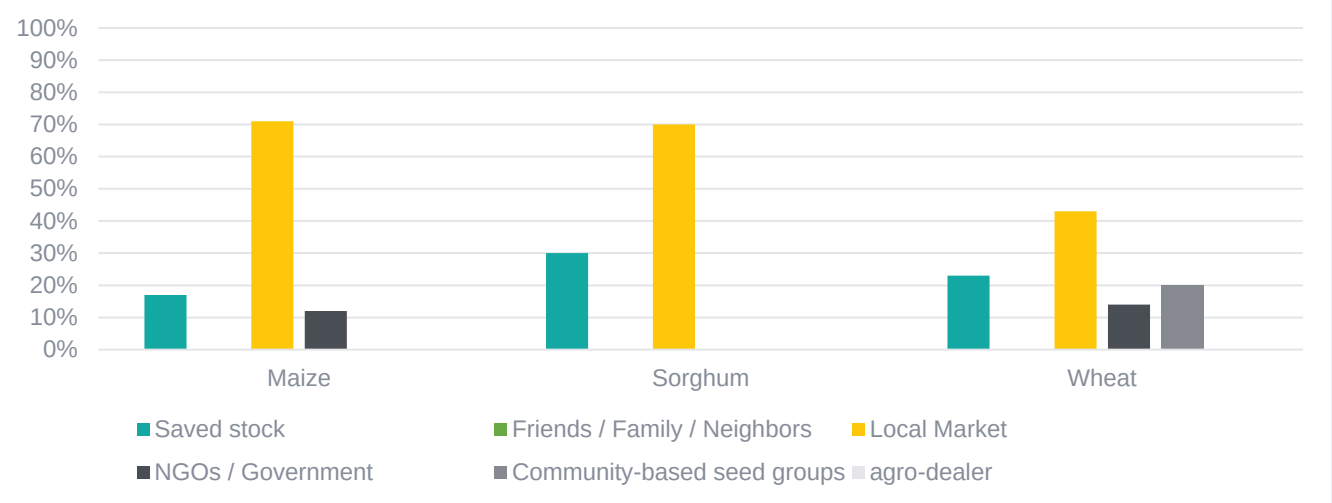
Figure 3 shows the major crops that surveyed farmers produce in Afar. These farmers differ significantly from the farmers in the other two regions. As discussed in Section IV.1, the expansion of irrigated agriculture in Afar has led them to focus on cash crops. Figure 3 shows that the primary source of seed for their cash crops is the local market and agrodealers, while their main sources of maize seed are the local market and saved stocks, and NGOs/government for open-pollinated maize varieties. Despite farmers accessing their cash crop seeds through local markets and agrodealers, the source of seeds for crops such as tomato and onion is mainly through illegal seed traders across border countries.

Figure 3. Farmers' seed sources for Afar, 2024/25 (n=75), organized by source



In Somali, only three crops were grown by more than 15% of the farmers (see Figure 4). These farmers rely primarily on the local market and saved stocks for their seed, although they do get some of their wheat seed from community-based seed groups.

Figure 4. Farmers' seed sources for Somali, 2024/25 (n=75), organized by source



Other SSSAs on the African continent reveal that farmers typically obtain roughly a third of their seed from their own saved stocks. The respondents in Tigray, Afar, and Somali however obtained 23% of their seed from their own saved stocks last season and plan on obtaining only 15% of their seed from saved stocks next season. Table 15 shows that the farmers' reluctance to resow their saved stocks came out in other parts of the survey as well. This is a surprising result. Typically farmers will resow improved varieties that they obtain from NGOs, government, and agrodealers, especially the improved varieties that they purchase from agrodealers. One potential explanation for farmers' reluctance to resow their own saved seeds may be related to the dependence syndrome caused by frequent direct seed distributions by NGOs and governments and farmers expecting the exotic seeds supplied through agrodelers would have better performance than local saved seeds.

In general, the data in this subsection show that farmers in all three regions rely on the local market for seeds, they are not exchanging seed with within their social networks, and they are resowing seed from their saved stock at roughly half the expected rate.

Table 15. Respondents' intention to replant seed

Source	N	Plan to sow again?	
		Yes	*No*
Home saved /own stock	131	18%	82%
Friends, neighbours, relatives	10	10%	90%
Local market	253	6%	95%
Agrodealer	34	12%	88%
Community-based seed groups	32	19%	81%
Government	56	25%	75%
NGO / FAO	51	16%	84%
Total	567*	12.3%	88%

**Note: The team surveyed 250 farmers. Each farmer planted multiple crops. Each crop had multiple sources. Therefore, 567 cases of planting were recorded.*

V.1.b. Overall Production Trends

In the FGDs, farmers discussed their agricultural production over the last three seasons. They said that in the last five years (2020-2024), there were two years (2022/2023 and 2023/2024) where they experienced significant drought. During these drought years, many households experienced food insecurity and could not meet their food requirements. The respondents said that the 2024/25 season was generally a good year with plenty of rain, the 2023/24 season was a poor to average year due to drought and grasshoppers, and the 2022/23 season was average (see Table 16).

Severe drought conditions in the 2023/24 season led to reduced harvests across almost all major crops. The drought had a profound impact on farmers' livelihoods, prompting large-scale food assistance from international organizations. While the 2022/23 yearwas an average year, significant bird damage depressed sorghum yields that year – even in average rainfall years, specific challenges can limit agricultural potential and impact food security. FGDs in Afar revealed more variable yields, with some crops and locations demonstrating consistent success while others exhibited significant fluctuations.

Table 16. Farmers' analysis of their production for the last 3 seasons (n = 20 Focus Groups)

Region	Key crops	2024/2025 season	2023/2024 season	2022/2023 season	Major Stressors
Afar	Maize	Average	Good	Poor	Drought (main stressor), Floods (Awash River, highland rain), Grasshoppers. Birds. Irrigation salinity (Lake Basaqa discharge). Prosopis invasion.
	Onion	Good	Good	Average	
	Wheat	Good	Average	Average	
Somali	Wheat	Good	Poor	Average	Drought (Belg rain failure), floods. Bird infestation (sorghum). Weeds (oats in wheat). Temperature increase.
	Maize	Good	Poor	Average	
	Sorghum	Poor	Poor	Average	
Tigray	Wheat	Good	Average	Average	Erratic rainfall (delayed onset, early cessation, excessive). Pests (grasshoppers on tef) and diseases. Deforestation during the conflict.
	Tef	Good	Average	Average	
	Barley	Good	Average	Good	
	Faba bean	Good	Poor	Poor	
	Chickpea	Good	Good	Good	
	Sorghum	Good	Average	Good	

According to the FGDs, farmers in all three regions are coming off a good agricultural season in 2024/2025. They said that they recently harvested higher than normal yields. In Tigray and Afar, this finding is corroborated by the household data. In the sasme season, only a small percentage of farmers in Tigray and Afar reported that their agricultural produces were poor yields (see Table 17) while the majority report coming off an average or good production year. In Somali, however, 43% stated that the last agricultural season produced poor yields.

Table 17. Farmers' analysis of their production for the 2024/25 season (n = 567)

Region	Good	Average	Poor
Tigray (N=219)	**55%**	34%	11%
Afar (N=137)	38%	**55%**	7%
Somali (N=211)	23%	34%	**43%**
All 3 Regions (N=567)	39%	39%	22%

At the time of data collection, the respondents were preparing to plant for the 2025/26 season. The surveyors asked them where they plan to source their seeds for next season. Table 18 shows that farmers have confidence that they will be able to find and afford seed from their own saved stocks, the local market, and—to a lesser extent—from agrodealers. Also, their reliance on direct seed distributions from NGOs and the government appears more correlated to past patterns of seed distribution than their actual need. Only 7% of respondents in Afar reported that last year was a poor year, and yet they still plan on obtaining 11% of their seed from NGO and the government distributions. Meanwhile, 43% of respondents in Somali reported that last year was a poor year, and they plan on obtaining 14% of their seed from NGOs and government distributions.

Table 18. Farmers' sources for seed for the next season, 2025/26

Region	Saved stocks	Friends, family, neighbors	Local markets	NGOs & government	Agro-dealers	Community-based seed groups
Tigray (n=7,036 kg)	34%	0%	25%	4%	9%	27%
Afar (n=4,798 kg)	26%	0%	46%	11%	18%	0%
Somali (n=78,511 kg)	13%	0%	61%	14%	0%	0%
All 3 Regions (n=90,336 kg)	15%	0%	57%	13%	1%	2%

The local market is a key source of seed for the respondents in the three regions. They obtained 48% of their seed at the local market in the 2024/25 season and they plan to obtain 57% of their seed from the local market in the 2025/26 season, suggesting their reliance on the market is stable. The local market reflects adaptability of the variety, timeliness, acceptable quality, and diversity. This reliance on the local market points to the need to strengthen decentralized sources of quality seed, ensuring farmers have timely access to diverse and well-adapted varieties. The reliance on their saved stocks went from 24% of their seed last season to a planned 15% in the 2025/26 season. Thus, the reliance on saved stock will fall 9% and the reliance on local markets is expected to rise by 9%. The respondents in Somali account for much of this change. Table 17 showed that 43% of respondents in Somali reported having a poor yield this last season. They plan to make up for the inadequacy in their saved seed stock with purchasing from the local market.

V.1.c. Planting Trends

An analysis of the household data from the 250 respondents reveals farmers collectively planted 12% less than normal in the 2024/25 season, and they intend to plant 4% less than normal in the 2025/26 season.

However, the results vary significantly among the three regions.[2] Tables 19 and 17 together help interpret these findings.

Most farmers in Tigray (89%) had an average or good harvest last year, and as a result, they plan to plant more seed than normal in the next season. As a result, they plan on planting more seed than normal next season (Table 19). Similarly, in Afar, 93% of respondents noted having an average or good 2024/25 season. Farmers here plan to plant 19% more seed than normal in the 2025/26 season. In Somali, however, Table 16 shows that 43% of respondents said that they had a poor harvest last year. Table 19 shows that farmers in Somali plan to plant 39% less than normal next year.

Table 19. Quantity of seed that respondents planted more or less than normal in the 2024/25 season, and quantity of seed that respondents intend to plant in the 2025/26 season

Region	Quantity of seed planted more or less than normal in the 2024/25 season	Quantity of seed that will be planted more or less than normal in the 2025/26 season
Tigray	-7%	+15%
Afar	+13%	+19%
Somali	-30%	-39%
All 3 Regions	-12%	-4%

Table 20 details the reasons why the farmers in Tigray and Afar planted more seed than normal in the 2024/25 season. The main reason is that they have more seed available due to a good harvest.

Table 20. Reasons farmers in Afar and Tigray provided for planting more seed than normal in the 2024/25 season (N=83)

Reasons	% of responses
SEED-RELATED	
• More seed available due to good harvest	35%
• More seed available due to free seed	23%
• More money to buy seed or seed price low	17%
• Have especially good seed or good variety	4%
NON-SEED FACTORS OF PRODUCTION (opportunities)	
• Have more land/more fertile land	8%
• Have tools/tractor, other machinery to help farm	1%
• Good weather/rainfall	1%
OTHER PRIORITIES/STRATEGIES	
Re-sowing due to stress (e.g. poor soils/ low germination rate)	8%

[2] Respondents have different reference points for "quantity normally sown" and are primarily relying on recall for the quantities planted. This led to data quality inconsistencies for some respondents. For example, one farmer responded that he normally plants 20 kg of maize when asked to compare *last* season to his normal amount. However, when discussing how his normal quantity compares to what he plans to plant *next* season, the same farmer responded that he normally plants 30 kg of maize. While the "normal" quantity would ideally not change year to year for this comparison, the assessment team has decided to present the imperfect data as-is, since it reveals some interesting trends.

Table 21 below reflects the reasons why farmers in Somali planted less than normal in the 2024/25 season. Lack of money is the major reason, suggesting that after a poor harvest, farmers in Somali have less money to buy seed. Figure 4 shows that their main sources of seed are the local market followed by their own saved stocks. Together, these suggest that farmers in Somali primarily obtain seed from the local market and their saved stocks and, after a bad season, they have less access to seed for the following season.

Table 21. Reasons farmers in Somali provided for planting less seed than normal in the 2024/25 season (N=149)

Reasons	% of responses
SEED-RELATED	
• No seed available in the market	11%
• No money to buy seed/poor finances or seed prices too high	58%
• Seed available is not good quality or the variety is not liked	5%
NON-SEED FACTORS OF PRODUCTION	
• Illness/health problems	1%
• No/insufficient land or land not appropriate/sufficiently fertile	3%
• Lack of tools/tractor/other machinery to farm	5%
• Plant pests/diseases make production not possible	7%
• Animals/predator make production not possible	3%
• Lack (availability) of other inputs: controlled water supply/irrigation or fertilizer	1%
• Poor weather/rainfall	5%

V.1.d. Key Findings: Acute Seed Insecurity

Findings suggest that farmers in **Tigray and Afar are not currently facing acute seed insecurity**. Seed systems in both regions appear relatively stable, supported by a generally good 2024/25 agricultural season that ensured sufficient seed availability and access. Most households reported adequate seed stocks from their own harvests or through local markets, with no significant barriers to obtaining preferred varieties. While localized challenges may persist for certain crops or vulnerable groups, there is no widespread indication of acute seed stress requiring emergency intervention.

In contrast, farmers in the **Somali Region are experiencing some level of acute stress in seed access**. Although grain is generally available in local markets—and many farmers continue to rely on these markets to source grain for planting, the overall seed security situation remains fragile. The 2024/25 agricultural season was poor (Table 17), leaving many households with limited resources and minimal saved seed stocks. Consequently, a proportion of farmers report plans to reduce their planting area or plant less seed than usual in the 2025/26 season (Table 19). These patterns suggest emerging, localized seed stress linked primarily to reduced purchasing power and depleted household reserves, rather than a complete breakdown of seed availability.

Interestingly, while Somali farmers indicated that they plan to cultivate a smaller area than normal in the 2025/26 season (Table 19), they also reported an intention to plant more seed than they did in 2024/25 (Table 22). This apparent contrast may reflect recovery trends following the poor 2023/24 harvest (Table 16)

and the relatively better outcomes in 2024/25, which have modestly improved farmers' capacity and confidence to invest in seed. This pattern points to early signs of recovery, where improved harvest outcomes are gradually strengthening farmers' ability and willingness to invest in seed despite ongoing access constraints.

Table 22. Total seed per household planted in 2024/25 and total seed per household that farmers intend to plant in 2025/26

Region	Total seed per household farmers planted in 2024/25 season (kg)	Total seed per household farmers intend to plant in 2025/26 season (kg)
Tigray (N=100)	80	70
Afar (N=75)	56	64
Somali (N=75)	722	1,047

Comparative analysis across the three regions reveals distinct patterns of seed security shaped by seasonal performance and production systems. Overall, the seed security situation varies across the three regions but remains largely stable, with localized stress observed in Somali. In Tigray and Afar, favorable seasonal performance in 2024/25 supported adequate seed availability and access, and most households are not facing acute seed insecurity. In contrast, Somali shows some localized and short-term stress, primarily due to reduced purchasing power and depleted household reserves following a poor 2024/25 season. Although total seed volumes per household in Somali are much higher than in the other regions—reflecting larger landholdings, mechanized production, and the predominance of wheat—these figures do not necessarily indicate stronger seed security. Rather, they underscore the structural differences in production systems across regions. Taken together, the findings suggest that while Tigray and Afar currently exhibit stable seed systems, Somali requires closer monitoring and targeted support to address emerging access constraints and to sustain the early signs of recovery observed among farming households. In summary, farmers across the three assessed regions are not currently experiencing acute seed insecurity, and the overall situation appears stable. Seed systems in Tigray and Afar remain stable, but localized access constraints persist in Somali Region.

Implications and Recommendations: Continued monitoring is recommended to track evolving seed access conditions, especially in Somali Region, to detect and respond to emerging stress early. Strengthening local seed production and distribution systems will be essential to maintain stability and build resilience across all three regions. Interventions should prioritize market-based seed support, farmer-led seed multiplication, and access to diverse, climate-adapted varieties to ensure that seed systems remain responsive to both short-term shocks and long-term production needs.

V.2. Chronic Seed Insecurity

Overall, farmers across Tigray, Afar, and Somali are not experiencing acute seed insecurity but continue to face chronic seed stress characterized by persistent limitations in seed quality, varietal diversity, and sustainable market access. While local markets and farmer-saved seed remain the dominant sources of planting material, these channels offer limited innovation and quality assurance. The chronic nature of seed insecurity in these regions reflects long-term structural weaknesses, including underdeveloped local seed production, weak private-sector engagement, and insufficient access to improved and adapted varieties.

V.2.a. Poor Physical and Genetic Quality of Available Seed

In the FGDs, there was general consensus among the male and female farmers that the physical and genetic quality of the seed they access is unsatisfactory. They said that **poor access to improved varieties and quality seed is a major impediment for all their crops**. Farmers in Somali said the physical and genetic quality of seed is especially poor for wheat, their most important crop, while farmers in Afar said the same about maize, their most important crop. It appears farmers are more sensitive to poor quality seed for their most important crops, where the stakes are the highest.

In the focus groups, the male and female farmers said that they faced serious problems in accessing certified seed from reliable sources. They mentioned reliability, availability, price, and timely delivery as their biggest concerns. The farmers said that the seed available to them are poor quality and expensive. The farmers said that they are able to access improved seed when the government or NGO programs distribute it to them. **While many of the respondents indicated that they consider the seeds supplied by government and NGOs to be better quality, they also said that these improved seeds are not necessarily aligned with their preferences in crop and variety.** For example, farmers in Afar stated that improved varieties that perform well in the highlands were distributed to them even though they are in the lowlands. The respondents said that some farmers take matters into their own hands and travel to other regions and cities to buy seed, or groups of famers will send one of their members to other regions in search for good seeds. They said if they cannot get access to improved varieties and quality seed of their typical crops, the may shift to crops for which they had more access to improved varieties and quality seed, such as cotton, onion, and watermelon.

The research team also interviewed six agro-processors. They uniformly stated that genetic quality is a major issue. The agro-processors stated that local farmers are growing varieties that have small grains and high proportions of chaff. One shut down operations when the government stopped distributing improved varieties to farmers because he could not make a profit processing the local varieties.

Box 3. Successful agro-processing using local varieties

The Lana Food Complex Factory is one of the agro-processing enterprises currently operating in the Tigray region. It was established in 2022, shortly after the onset of the conflict. Initially, it was designed to process a range of wheat-based products such as pasta, macaroni, and others. However, at present, the factory is solely focused on flour production.

The factory exclusively utilizes locally-produced wheat, with its procurement based on key quality criteria such as wheat hardness (soft vs. hard) and moisture content. Farmers from nearby areas deliver wheat directly to the factory for sale. The factory prioritizes local wheat due to its high quality and strong consumer preference, particularly among urban customers. The factory does not specify a preference for any particular wheat variety, focusing instead on overall grain quality.

The factory distributes its flour products in 5, 10, 25, and 50 kg packages through a network of wholesale and retail agents located in six nearby towns. Despite having a daily production capacity of 82 metric tons, the factory remains underutilized. In the period from January 2024 to December 2024, the factory produced approximately 1,000 metric tons of flour, far below its potential output.

The research team asked farmers and key informants about the improved varieties that are currently available to farmers in Afar, Tigray, and Somali. Wheat demonstrates the highest varietal diversity, with nine new varieties distributed being demonstrated in recent years. Five new varieties of wheat were demonstrated in 2022 (Daka, Wane, King bird, Paven 74, Qubsa) and another four were demonstrated and adapted in 2024 (Danda'a, Boru, Gambo, Qaqaba), indicating a recent surge in wheat breeding efforts particularly for lowland agroecology. However, national breeders have developed fewer varieties of other crops. For tef, breeders released only five new varieties in recent years (Quara in 2024; Nigus and Dagim in 2023; Boset and Kiros in 2022). For the other main crops, national breeders have released only one new variety per crop in recent years: Malkasa 2 in 2023 (maize); Bombay red in 2024 (onion); Birhan in 2024 (sorghum); Roma VF in 2024 (tomato); Oval in 2023 (watermelon); HB 1305 in 2023 (barley); Lakie in 2023 (common bean); and RDC in 2024 (cotton). When asked about the central access issues for new varieties for their main crops, the respondents said that improved wheat seed is expensive and unavailable, they do not have access to a drought resistant (early-maturing) sorghum variety, and new varieties of maize are generally unavailable.

The seed systems in the Tigray, Afar, and Somali regions are distinct. For example, the seed system in Tigray is more developed than the seed systems in Afar and Somali, and a lot of the improved seed distributed by the regional governments in Somali and Afar are sourced from other regions, indicating a need to enhance local seed multiplication and production.

However, the crucial point is that **farmers in all three regions report that the seed they can access is of poor physical and genetic quality, they only obtain improved seed from direct distributions, and these distributions often provide unsuitable crops and varieties.**

V.2.b. Absence of Durable, Market-Based Sources for Improved Seed

The farmers lack sustainable market-based sources of improved seed, especially for their most important food security crops—wheat, maize, tef, sorghum, and barley. Agrodealers and private seed companies are nearly non-existent. In the Somali region, the research team could not find a single agrodealer in the assessment districts. Among all respondents, only 1.5% of the seed they obtained for the 2024/25 season came from agrodealers, and the vast majority of that was vegetable and cotton seed, but not mainly legal seeds.

In the household survey, farmers were asked how often they accessed a new variety over the past five years. In this case, “new” refers to any variety the farmer had not planted before, regardless of whether that variety is from a neighbor, a local market, an NGO, or an agrodealer. For instance, if a farmer bought and planted a local variety for the first time last year, that counts as a new variety. But if a farmer obtained an improved variety from an NGO that they had planted earlier in their lifetime, this that would not count as a new variety. This question aimed to assess the level of innovation entering the seed system, regardless of variety type.

Only 39% of the respondents obtained a new variety in the last five years, and the average number of new varieties they obtained was 1.7. This is a low amount of innovation entering the seed system, indicating a major source of chronic seed stress. Furthermore, Table 23 shows that the majority of those new varieties are obtained in Tigray, while farmers in Afar and Somali had very little access to new varieties. Somali is particularly low, with only 16% of farmers obtaining a new variety in the last five years. Table 23 also shows that the majority of the new varieties that farmers access are from the government, NGOs, and community-

based seed groups. Once again, the situation in Somali is notable, with the only source of new varieties being NGOs and government.

Table 23. Percent of farmers who obtained a new variety in the last 5 years (n=250)

Region	Obtained a new variety in the last 5 years	Percent of those new varieties was obtained from:					
		Direct Distributions		*Community-based seed groups*	*Local Markets*	*Agro-dealers*	*Friends, family, neighbors*
		NGOs	*Government*				
Tigray	62%	33%	18%	**38%**	6%	2%	2%
Afar	32%	22%	**52%**	4%	9%	13%	0%
Somali	16%	29%	**71%**	0%	0%	0%	0%

Community-based seed groups comprise cooperatives and organized groups that produce seed for a number of improved varieties. These community-based seed groups appear like a sustainable, market-based source of innovation in the farmers' seed system. However, these seeds are purchased by the government or NGOs and then distributed to farmers (e.g., via direct distributions, vouchers, or seed loans). Key informants stated that the quality of this seeds is average, with moderate regulatory supervision.

Furthermore, these community-based seed groups are mainly present in Tigray. Looking specifically at the 2024/25 season, around 7% of respondents sourced seed from community-based seed groups, and most of them are in Tigray. The farmers in Afar and Somali did not obtain new varieties from community-based seed groups last season.

Table 24 corroborates the prominence of seed aid in Tigray, Afar, and Somali. The respondents have received varying levels of seed aid, and most of that aid has come as direct seed distributions.

Table 24. Farmers' sources of new varieties through seed aid in the last 5 years in all three regions

Region	Received seed aid in the last 5 years	Methods of distribution		
		Direct Seed Distributions (DSD)	*Vouchers*	*Seed loan*
Tigray	52%	80%	14%	6%
Afar	43%	86%	11%	3%
Somali	11%	88%	12%	0%

Table 25 shows the relation between sources of seed and sources of new varieties. Once again, it is evident that the local markets are an important source of seed, but not an important source of new varieties. Also, agrodealers are not a major source of seed or new varieties, and most of the seed being sourced from agrodealers is vegetable and cotton seed.

Table 25. Farmers' sources of new varieties in the last 5 years compared to seed last season in all three regions

Source	Sources of new varieties in the last 5 years (N=143)	Sources of seed last season (N=567)
Saved stocks	N/A	27%
Friends, neighbours, relatives	1%	1%
Local market	6%	42%
Agro-input dealer	4%	7%
Community-based seed groups	27%	7%
Government	32%	9%
NGOs / FAO	31%	6%

V.2.c. Role of Local Markets

As local markets are a major source of seed for farmers in all three target regions, the research team spoke to six potential seed vendors in local markets. "Potential seed vendors" are grain vendors in the local markets who separate out the best grain to sell as seed, typically at a higher price than the grain. The potential seed vendors said that they try to buy quality grain from known farmers from within their regions. When these vendors purchase potential seed directly from farmers, they observe the visual characteristics and look for uniformity, cleanliness, shininess, and a lack of dark colored seed. They also smell the potential seed to ensure the seed does not have a rotten, musty, or sour smell, and they press samples of the potential seed between two fingers to make sure it is not soft.

Once they purchase potential seed from a farmer, the potential seed vendors try to properly store their potential seed by protecting it from moisture and pests. However, they acknowledged that their storage practices are not ideal. None of them have dedicated or standard storage facilities designed to maintain seed viability and quality, such as those with temperature or humidity control. Additionally, they rarely keep a separate stock of freshly harvested seed, which would typically be necessary for reducing contamination risks.

Despite these constraints, traders do engage in quality assurance (see Table 26). They sort out waste materials and visibly damaged grains, presenting the cleaner product at a premium price. Some of these potential seed vendors said that they also conduct germination tests, while others do not.

In their shops and stalls, these vendors sell grain and seed at different prices. For example, they can sell wheat seed for 6,000-7,000 Birr per quintal and they sell wheat grain for 4,500-5,000 Birr per quintal. This price differentiation reflects the informal trust-based system that governs seed transactions in these local markets.

Table 26. Local market vendors' treatment of grain/local seed

Criteria	Potential Seed Vendors	
	Tigray, Somali, Afar (n=6)	*Average from 10 other SSSAs in Africa (n=211)*
Seek out specific varieties to buy (which can be planted)	33%	75%
Buy from specific growers who are known for high-quality seed	17%	48%
Keep single variety pure	100%	73%
Separate freshly harvested stock apart	17%	71%
Sort out waste (pebbles, dirt, etc.)	67%	71%
Sell seed and grain separately at different prices	100%	43%

The potential seed vendors reported that local farmers often request specific varieties by name. For example, many farmers ask for Dendea, a popular cultivar of wheat in the regions. As a result, some of the potential seed vendors said they intentionally buy Dendea and sell it as seed to meet this local demand. Potential seed vendors in Tigray said that farmers tend to ask for "government seed." This term is not associated with a specific variety but is used to indicate improved seed that has likely been distributed through formal channels in the past. As a result, traders in these areas focus on sourcing locally-produced improved varieties without concern for exact varietal identity. This practice reflects a general preference for improved seed but also highlights a gap in variety-specific knowledge among potential seed vendors and farmers.

In all the target regions of this assessment, the local market networks were active and the transportation routes were open, allowing for the free movement of agricultural products such as seed and grain. Market days are regularly held and functional, providing farmers with reliable access to local markets. Farmers purchasing seeds in local markets consistently showed a strong preference for seeds sourced from farmers who are local to their region. The farmers sought out local seed because they trusted its suitability to their local agroecological conditions.

Local traders buying grain. Gebre Hadigu (PhD)

Box 4. An agricultural input supplier in Afar

Redwan sells onion, tomato, watermelon, and occasionally maize seeds to farmers in the town of Dubti. He also sells various types of chemicals and fertilizers. He obtains much of his seed and input stock from the town of Kombolcha in the neighboring region of Amhara. Traders from Kombolcha collect seeds from different parts of the country. Kombolcha serves as a collection center for seed and traders. Redwan calls his suppliers in Kombolcha in advance of his trips to order seed, explaining types, quality and amount. Redwan also buys watermelon from Addis Ababa, and unpacked tomato from the town of Meki in the Oromia Region. He recently stopped purchasing the unpacked local white onion seed because of very low demand in Dubti. He is currently considering halting all purchases of unpacked local seed unless the seller enters into written and binding agreement to guarantee the quality of the seed.

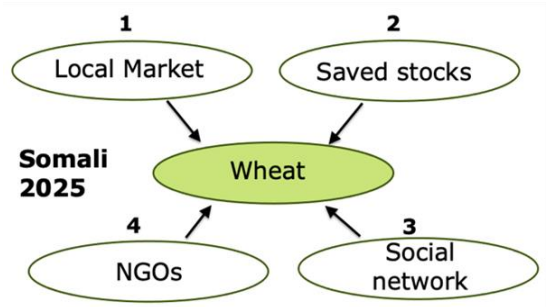
A robust cultural practice exists around seed management, emphasizing the importance of seed purity and careful handling throughout the entire process—from harvesting and drying to storage and sale—to ensure the seed's viability and performance. In these communities, trust and reputation play a pivotal role in seed transactions within local markets. It is considered a serious breach of trust to sell grain as seed unless it meets specific local standards of quality. Farmers adhere strictly to these unwritten rules, which include ensuring the seed is free from impurities, not mixed with other varieties, and properly stored to maintain its germination potential. This cultural norm helps maintain the integrity of local seed systems and supports agricultural practices.

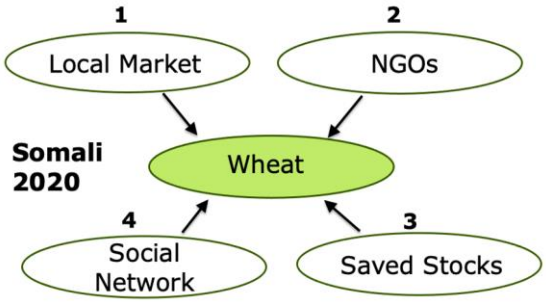
As an example, a seed collector in Shikomajo, Tigray region shared an experience with the SSSA team during a grain purchase. When asked whether the grain he was buying would be used for seed, he explained that it could not be, as the grain contained impurities and did not meet local seed quality standards. Instead, he directed the assessment team to a nearby farmer known for producing the same type of grain, but with superior purity suitable for seed use. These practices underscore the critical importance of recognizing and supporting local seed systems as a complement to formal seed distribution channels.

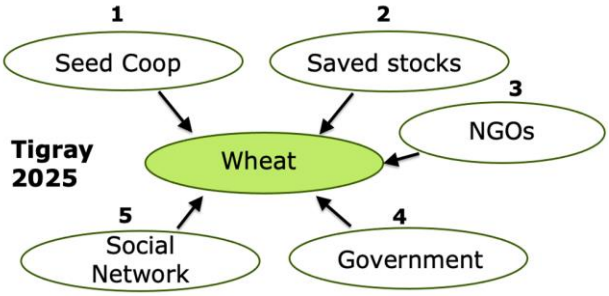
V.2.d. Ongoing Trends in Seed Sources

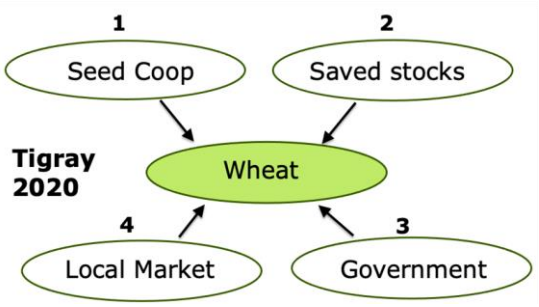
In the FGDs, the research team asked male and female farmers about the evolutions of their seed sources over the last five years. The respondents reported that their seed system is generally static (see Figure 5). The main sources of their seeds are local markets, saved stocks, NGOs, government, and their social networks (friends, neighbors, and family). Figure 5 shows that the farmers' seed systems are not dynamic and dependent on aid from NGOs and government actors. A striking absence from this data is the private sector actors. The respondents generally did not mention agrodealers, seed companies, or private seed producers. The respondents in one of the groups in Tigray mentioned community-based seed cooperatives as a major source of wheat seed. However, this seed is purchased by NGOs and distributed to the communities via vouchers, seed loans, and direct distributions. These community-based seed cooperatives are mainly marketing their seed directly to the farmers, NGOs, and sometimes sell to institutional buyers, such as unions and seed enterprises.

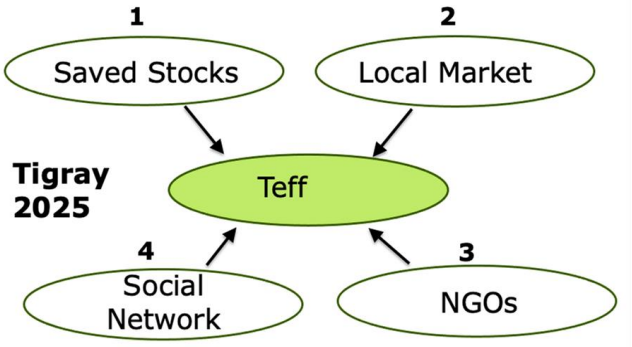
Figure 5. Seed sources for respondents in Somali and Tigray in 2025 and 2020

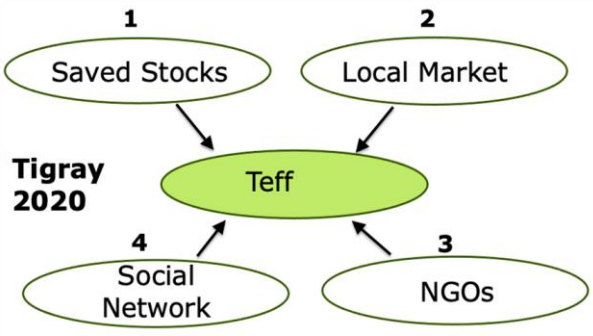


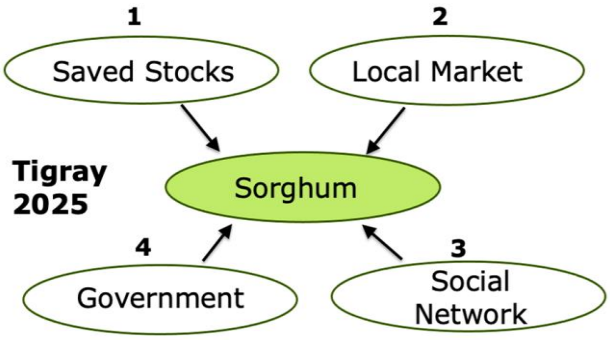


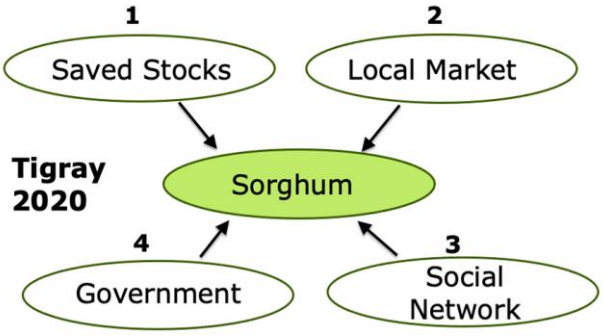












V.3. Conclusions

The farmers in Tigray, Somali, and Afar are experiencing chronic seed insecurity, not acute seed insecurity. Direct distributions of improved varieties are not currently required because the farmers have access to enough seed through informal channels. They save seed from their own harvests, exchange with neighbors, and buy from local markets. This diversity of sourcing strategies underpins the resilience of their seed systems.

Yet, these systems show little market-driven innovation. Most farmers only obtain new varieties through free seed distributions from NGOs or the Food and Agriculture Organization of the United Nations (FAO)—and typically without choice in which variety is offered. Private-sector actors such as agrodealers, seed companies, or independent local seed producers are virtually absent. The existing agrodealers focus on vegetable seed and a limited supply of liquid fertilizers and pesticides. The scarcity of agrodealers, coupled with their challenges in securing an adequate supply of seeds from enterprises or alternative sources, significantly impedes their capacity to serve the extensive population of farmers within these regions.

The availability, access, and quality of seeds in Ethiopia, particularly in the assessment areas, pose significant challenges to agricultural production and productivity. Factors contributing to the constraints in availability of quality seeds include inadequate research for new varieties, low seed multiplication capacities at federal and regional levels, and limited participation of farmers' organizations in seed production. Weak markets and value chains also contribute to the low supply of quality seeds.

The low capacities of crop research and seed-producing enterprises, as well as challenges faced by cooperatives and producers' groups, hinders the release of new varieties and the production of adequate quality seeds. These challenges include weakened organizations due to conflicts or lack of support, inadequate infrastructure and technical assistance, and capacity limitations in production facilities. Unpredictable rainfall patterns, frequent droughts, pest infestations, and crop diseases further exacerbate the difficulties faced by farmers and seed-producing enterprises, particularly in regions like Somali and Afar. Improving local grain markets and integrating quality seed supply with grain markets could enhance seed access for farmers, ultimately contributing to increased agricultural productivity and food security in Ethiopia.

In Tigray’s highland mixed farming systems—where crop and livestock production are integrated—seed insecurity is driven by multiple, overlapping challenges. These include recurrent drought, pest outbreaks, limited access to improved seed varieties, and disruptions to formal and informal seed distribution networks. In contrast, the Afar and Somali regions, defined by arid lowlands and predominantly pastoralist livelihoods, face seed security constraints linked to erratic rainfall, limited availability of drought-tolerant varieties, and the increasing vulnerability of small-scale crop production to climate shocks.

Despite these challenges, communities are identifying and implementing strategies to mitigate adverse effects. Using damaged crops, resulting from rainfall shortages and diseases, as animal feed exemplifies resourcefulness in the face of adversity. Employing family labor to control bird populations demonstrates a commitment to minimizing crop damage through local solutions. The reliance on local seeds to address the high costs and scarcity of improved seed varieties reflects an adaptive response to market limitations. The farmers’ capacity to shift to new crops and varieties based on market demand and agroecological constraints demonstrates their proactive approach to managing their production systems. These community-driven initiatives indicate the potential for innovation and resilience in navigating the complexities of a changing agricultural environment.

Comparing Chronic and Acute Seed Insecurity

The findings across Tigray, Afar, and Somali highlight a clear distinction between acute and chronic seed insecurity. While acute insecurity arises suddenly from shocks such as drought or conflict—resulting in short-term shortages and the need for emergency interventions—chronic seed insecurity reflects long-standing structural weaknesses in the seed system. These include persistent limitations in seed quality, variety development, and market access.

In the assessed regions, acute seed insecurity is currently minimal due to generally good seasonal performance in 2024/25, but chronic constraints remain pervasive. Addressing these deeper, systemic issues will require long-term investment in seed system development, focusing on strengthening local production, promoting market linkages, and enhancing farmers' access to diverse, high-quality, and well-adapted varieties as well as enhancing the enabling environment and institutional arrangments.

Chronic constraints remain pervasive and will require longer-term investments in seed system development.

Conclusion

Overall, the assessment shows that farmers in Tigray, Afar, and Somali currently have sufficient seed to meet immediate planting needs, indicating stability in the short term. However, the persistence of chronic seed insecurity—driven by weak seed systems, limited varietal renewal, and poor market integration—continues to undermine long-term resilience and productivity. Building sustainable, farmer-centered seed systems that combine formal and informal strengths will be critical to ensuring both immediate stability and enduring seed security across the three regions.

VI. Recommendations

Building on the findings of both acute and chronic seed insecurity, the recommendations below outline actions to strengthen seed system resilience across Tigray, Afar, and Somali. While acute seed insecurity has largely stabilized due to favorable seasonal performance, chronic constraints remain entrenched—manifesting in poor seed quality, limited varietal diversity, and weak market-based supply. Addressing these challenges requires a dual approach: sustaining short-term stability through timely monitoring and targeted support, while investing in long-term system strengthening. The proposed actions therefore emphasize local seed production, market linkages, varietal innovation, and institutional coordination as key pathways toward durable and inclusive seed security.

1. Strengthen Local Seed Production and Multiplication Systems

Across all three regions, chronic insecurity is closely tied to the limited availability of quality seed and the dependence on external distributions. Strengthening local seed production—through community-based seed producers, cooperatives, and farmer-led enterprises—will help ensure that farmers have access to diverse, well-adapted, and affordable seed close to home. In Afar and Somali, where formal seed systems are weakest, capacity-building support for small-scale multipliers and producer cooperatives is essential. Partnerships with regional research institutes and extension services can improve the technical quality and genetic purity of seed produced locally. Over time, these efforts will reduce reliance on NGO or government distributions and create more self-sustaining regional seed economies.

2. Enhance Varietal Innovation and Adaptation

Farmers' limited access to improved and locally adapted varieties is a defining feature of chronic seed insecurity. Only 39% of farmers accessed a new variety in the past five years, with Somali showing the lowest levels of varietal renewal. Strengthening the link between national research programs and regional seed systems is critical. This includes expanding participatory variety selection (PVS) trials, promoting lowland-appropriate, drought-tolerant varieties, and ensuring that breeding programs incorporate farmer preferences for key crops such as wheat, maize, and sorghum. Establishing more effective feedback mechanisms between farmers, researchers, and seed enterprises will help ensure that new varieties reach farmers faster and respond to the realities of local agroecologies.

3. Strengthen Varietal Quality

To improve varietal quality, research and development efforts should establish platforms that connect breeders at regional research institutes (e.g., TARI, SoRLARI, APARI) and farmers to jointly develop and identify varieties that meet the needs of both male and female farmers. Breeders can provide the new varieties and design the replicated trials, farmers can manage the trails, and development interventions can organize and finance their implementation. These demonstration trials conducted under real farming conditions will ensure local adaptation and farmer acceptance. Replicated variety portfolio demonstration plots in target villages should be supported, allowing farmers to test high-quality seed and new varieties in their own environments. Once farmers select preferred varieties, local systems for sustainable seed multiplication should be promoted, along with effective distribution channels—ideally through market-based approaches—to ensure lasting access to new varieties. Together, these efforts will increase farmers' appreciation of improved varieties and help address chronic seed insecurity in the region.

Development interventions should also strengthen farmers' capacity in seed production and preservation and pre- and post-harvest management practices; conduct demonstrations of quality seed production under recommended practices; and facilitate access to cost-effective post-harvest technologies. This approach enables farmers in demonstration villages to learn how to produce quality grain and seed, thereby decentralizing access to improved varieties. It would bring multiple benefits: tackling the lack of genetic quality in Tigray, Somali, and Afar; strengthening farmers' understanding of improved practices; and facilitating direct access to quality seed.

A development project could adapt the Farmer Field School model or similar organizational approaches to manage these trials. Additionally, development interventions should focus on raising farmers' awareness of new varieties and the market channels where they can be obtained.

4. Strengthen Farmer-Led and Decentralized Seed Systems

Support farmer-led innovation and informal seed systems

Informal seed systems—comprising farmer-saved seed, exchanges, and local markets—remain the foundation of seed access across Tigray, Afar, and Somali. These systems are functional, widely trusted, and well-adapted to local conditions, yet their potential is constrained by inconsistent seed quality, limited access to improved varieties, and weak linkages to formal systems. Rather than replacing these systems, interventions should aim to enhance their quality and performance. This can be achieved through training farmers and local seed traders in selection, handling, and storage techniques to improve seed viability and purity. Supporting collective action through farmer seed producer associations can facilitate scale and coordination, while introducing community-based certification and truth-in-labeling schemes can strengthen local trust and market credibility. Recognizing and building on these informal systems will promote farmer innovation, inclusivity, and resilience, while creating a bridge between traditional and formal seed sectors.

Strengthen existing decentralized seed production models

The seed systems in Tigray, Afar, and Somali already include decentralized seed production structures involving regional research institutes (TARI, SoRLARI, and APARI), regional seed enterprises (TSE, SoRSE, and ASE), and cooperative networks that multiply and distribute seed—particularly in Tigray. However, their capacity to produce and deliver new and locally adapted varieties remains limited, and much of their output is oriented toward institutional buyers such as government programs and NGOs rather than the open market. Strengthening these systems will require greater alignment with farmer demand and the creation of more market-oriented supply chains. Partnerships between research centers, seed enterprises, and farmer cooperatives should be expanded to ensure that improved and climate-adapted varieties reach farmers quickly and reliably. Providing technical support, infrastructure investment, and improved access to early-generation seed will further enhance the efficiency, quality, and sustainability of these decentralized production systems.

Together, these measures will build a more integrated and responsive seed sector, capable of ensuring that quality seed—produced locally and tailored to farmer preferences—remains available, affordable, and adapted to the diverse agroecological contexts of the three regions.

5. Promote Market-Based Seed Access and Private-Sector Engagement

Seed access across Tigray, Afar, and Somali remains largely dependent on informal and aid-based channels, with minimal private-sector participation and weak market integration. Building a vibrant, market-driven seed system requires interventions that strengthen local markets, attract private investment, and link farmers more directly with reliable suppliers of quality seed. This approach should balance short-term measures to improve last-mile access with long-term strategies to develop a more competitive and sustainable seed market.

Strengthen last-mile seed systems and linkages

Improving the last-mile delivery network is critical to ensuring that farmers—particularly in remote or fragile areas—can access quality seed in time for planting. Strengthening the capacity of community-based seed producers as well as community seed banks, and attracting private seed producers into chronically seed-insecure areas will help extend supply to underserved communities. Establishing stronger connections between seed producers, village shops, agrodealers, and selling agents will ensure that improved varieties reach farmers efficiently and consistently.

Stimulate market demand through inclusive mechanisms

Where affordability limits farmer access, seed fairs and voucher systems can be used to stimulate demand while supporting local producers. Seed fairs allow community seed cooperatives and enterprises to sell directly to farmers, while vouchers enable farmers to choose preferred seed types and redeem them with participating suppliers. Over time, these mechanisms can transition from aid-supported interventions to self-sustaining market events that connect farmers, cooperatives, and agrodealers.

Incentivize private-sector participation and innovation

To attract and retain private investment in seed production, smart subsidies can be targeted toward seed enterprises and cooperatives introducing and multiplying drought-tolerant and climate-resilient crop varieties. Development partners and regional governments should also support the availability of Early Generation Seed (EGS) by working with local producers to ensure continuous supply. Strengthening market linkages between seed cooperatives, formal traders, and retailers with established customer networks will help integrate improved seed into regular market systems and stabilize demand.

Formalize and build capacity of local seed traders

Informal grain and seed traders already play a key role in supplying farmers, particularly in Somali and Afar. These actors should be formally recognized and capacitated as agrodealers or selling agents, integrated into quality-assured distribution networks that link them to seed enterprises and cooperatives. Training and certification for these traders can enhance their business capacity, transparency, and compliance with seed quality standards—bridging the gap between informal and formal markets.

6. Rehabilitate and Invest in Seed Infrastructure

A strong seed market system also depends on functional infrastructure for seed production, processing, and quality control. Key informants stated that the regional research centers and regional seed enterprises are

not able to produce sufficient quantities of basic and certified seed. Sustainable seed production necessitates irrigation, especially in drought-prone regions like Afar and Somali. Seed enterprises and research centers require reliable irrigation to ensure sufficient, high-quality seed yields, mitigating losses caused by drought and erratic seasons. Development interventions should support these regional research centers and regional seed enterprises in the acquisition of irrigation systems, so they can produce more basic and foundation seed.

Additionally, in the medium to long term, investment is needed to rehabilitate core seed infrastructure, particularly in Tigray, where conflict-related damage has weakened processing and storage capacity. Similarly, regional governments in Afar and Somali—with the collaboration of development partners—should prioritize strengthening the ASE and SoRSE. Key investments include seed storage facilities, quality testing equipment, processing units, and basic mechanization. A coordinated implementation of these actions will foster competition, transparency, and improved access across the seed sector.

7. Improve Coordination, Regulation, and Institutional Support

Seed system performance is hampered by fragmented institutional roles and weak regulatory oversight. Strengthening coordination among regional agricultural bureaus, research centers, NGOs, and private sector actors is essential to create a more coherent seed system. This can be achieved by revitalizing multi-stakeholder seed platforms and aligning activities under regional context frameworks such as the Ten Guiding Principles for Good Seed Aid (SeedSystem & Mercy Corps, 2024) that fosters market-based and resilient seed systems. Improved regulatory capacity—especially in seed quality control, certification, and varietal release—will ensure that both public and private seed actors operate under clear and trusted standards.

8. Maintain Seasonal Monitoring and Early Warning for Seed Security

Although acute seed insecurity is currently limited, periodic monitoring is vital to detect emerging risks—particularly in Somali, where seed access remains fragile due to low purchasing power and depleted reserves. Integrating seed security indicators into existing early warning systems (e.g., food security or climate risk monitoring) will enable faster, more targeted responses. Data collection should include local market functionality, seed price trends, and farmer planting intentions to anticipate potential shortages and guide preparedness measures ahead of planting seasons.

9. Additional Cross-cutting Recommendations

- **Advance gender-responsive programming:** Develop credit schemes tailored for women, promote labor-saving technologies, and ensure women's inclusion in varietal testing, seed multiplication, and market initiatives.
- **Phase out unsustainable direct seed distributions:** Use market-based responses whenever possible. Where direct distributions are unavoidable, ensure farmers are informed of the varieties and producers involved, and introduce cost-sharing mechanisms (e.g., gradual farmer contributions) to build habits of market-based seed acquisition.

Conclusion

Building resilient seed systems across Tigray, Afar, and Somali requires moving beyond short-term responses toward long-term, locally-grounded solutions. The findings demonstrate that while acute shocks have subsided, chronic constraints persist—demanding coordinated action from government, research institutions, development partners, and the private sector. In the near-term, priorities include maintaining seasonal monitoring, supporting localized seed production, and addressing the immediate gaps in Somali and Afar through targeted interventions. In the medium-term partners should focus on strengthening local seed enterprises, enhancing varietal innovation, and building reliable market linkages.

A balanced strategy that strengthens local production, enhances market functionality, and promotes varietal innovation and farmer participation will be key to sustaining long-term progress. By embedding these actions within regional frameworks of good seed aid standards, such as those promoted in the Ten Guiding Principles for Good Seed Aid (SeedSystem & Mercy Corps, 2024), stakeholders can build a resilient, inclusive, and market-driven seed system response and development that empowers farmers, sustains productivity, and supports adaptation to climate variability—building lasting resilience and self-reliance for farming communities across the three regions.

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