Sesame Value Chain Development Strategy

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Addis Ababa, Ethiopia
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</tr>
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<tbody>
<tr>
<td>ACDI/VOCA</td>
<td>Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance</td>
</tr>
<tr>
<td>ACSI</td>
<td>Amhara Credit and Savings Institution</td>
</tr>
<tr>
<td>AGP</td>
<td>Agricultural Growth Program</td>
</tr>
<tr>
<td>AMDe</td>
<td>Agribusiness and Market Development</td>
</tr>
<tr>
<td>ATA</td>
<td>Ethiopian Agricultural Transformation Agency</td>
</tr>
<tr>
<td>BoA</td>
<td>Bureau of Agriculture</td>
</tr>
<tr>
<td>CBE</td>
<td>Commercial Bank of Ethiopia</td>
</tr>
<tr>
<td>CGIAR</td>
<td>Consultative Groups for International Agricultural Research Centers</td>
</tr>
<tr>
<td>CSA</td>
<td>Central Statistical Agency</td>
</tr>
<tr>
<td>CU</td>
<td>Cooperative Union</td>
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<tr>
<td>DA</td>
<td>Development Agent</td>
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<td>ECPA</td>
<td>Ethiopian Consumer Protection Agency</td>
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<tr>
<td>ECX</td>
<td>Ethiopian Commodity Exchange</td>
</tr>
<tr>
<td>EIAR</td>
<td>Ethiopian Institute of Agricultural Research</td>
</tr>
<tr>
<td>ENHI</td>
<td>Ethiopian Nutrition and Health Institute</td>
</tr>
<tr>
<td>EPOSPEA</td>
<td>Ethiopian Pulses, Oilseeds and Spices Processors and Exporters Association</td>
</tr>
<tr>
<td>ERCA</td>
<td>Ethiopian Revenues and Customs Authority</td>
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<tr>
<td>ESE</td>
<td>Ethiopian Seed Enterprise</td>
</tr>
<tr>
<td>ETB</td>
<td>Ethiopian Birr</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agricultural Organization</td>
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</tbody>
</table>
FCA  Federal Cooperative Agency
FCU  Farmer Cooperative Unions
FTC  Farmers training Center
GTP  Growth and Transformation Plan
HACCP  Hazard Analysis & Critical Control Points
IBC  Institute of Biodiversity Conservation
IPM  Integrated Pest Management
ISO  International Standards Organization
ISTA  International Seed Testing Agency
IWRM  Integrated Water Resource Management
MFI  Micro Finance Institution
MLE  Monitoring, Learning and Evaluation
MoA  Ministry of Agriculture
MoARD  Ministry of Agriculture and Rural Development
MoFA  Ministry of Foreign Affairs
MoFED  Ministry of Finance and Economic development
MoI  Ministry of Industry
MoT  Ministry of Trade
MoWCYA  Ministry of Women, Children and Youth Affairs
NGO  Non-Governmental Organization
OCSSCo  Oromia Credit and Savings Share Company
PC  Primary Cooperative
RARI  Regional Agricultural Institute
RBoA  Regional Bureau of Agriculture
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>RCPA</td>
<td>Regional Cooperative Promotion Agency</td>
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<tr>
<td>RSE</td>
<td>Regional Seed Enterprise</td>
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<tr>
<td>RuSACCOs</td>
<td>Rural Savings and Credit Cooperatives</td>
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<tr>
<td>SBN</td>
<td>Sesame Business Network</td>
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<td>SHF</td>
<td>Small Holder Farmer</td>
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EXECUTIVE SUMMARY

Sesame is strategically important to Ethiopia, as it consistently ranks as a top performing export crop and plays a great role in the country’s economy. In the last few years (2007-2011), Ethiopia was the world's 3rd largest sesame exporter, supplying to China and Turkey. Despite its strong position in the global sesame market, Ethiopia only reaches lower value markets, with ~95% of its sesame exported in raw form. Moreover, the country is not leveraging diversified export market strategies and engaging in agro-processing unlike its major competitors, India and Nigeria. In order to transform the sesame sector, Ethiopia should focus on (1) continuing to export to its conventional markets (2) diversifying further towards higher value conventional markets (3) entering premium markets, and (4) increasing the volume of value addition.

Today, Ethiopia’s sesame sector is performing below its full potential due to various challenges out of which 26 strategic bottlenecks have been identified across the value chain (Table 1). Some of the major bottlenecks are: (1) improved seed varieties are not effectively developed, produced and distributed, (2) agronomic practices are not effectively researched and disseminated to farmers, and (3) cooperatives do not have the capacity to meet input and output demand of farmers.

In order to address the bottlenecks, forty six interventions have been identified along the sesame value chain (Table 1). These proposed interventions will help Ethiopia move towards diversified export markets, positively impacting sesame farmers of the country. The summary of strategic interventions in each component of the value chain is presented in Table 2. As it is shown in Fig. 1, the interventions are prioritized for easy implementation and impact evaluation as (1) short-term, implementable with the available knowledge and resources within existing systems (2) medium-term, require some additional knowledge and/or resources in poorly functioning systems (3) long-term, require more intensive knowledge and resources, in poorly functioning or nonexistent systems.
Table 1: Summary of bottlenecks and interventions in each value chain component

<table>
<thead>
<tr>
<th>Value chain component</th>
<th>Challenges</th>
<th>Interventions</th>
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<tbody>
<tr>
<td>1 Research &amp; Technology Development</td>
<td>4</td>
<td>7</td>
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<tr>
<td>2 Input production, supply and distribution</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>3 On-farm production</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4 Post-harvest handling and agro processing</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5 Market</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>23</strong></td>
<td><strong>31</strong></td>
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Table 2: Key interventions in each sesame value chain component

<table>
<thead>
<tr>
<th>Value Chain Component</th>
<th>Key Interventions</th>
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| Research & Technology Development      | • Enhance sesame breeding efforts through modern tools of plant breeding to develop shattering and pest tolerant varieties with good market traits (color, oil, aroma)  
• Build capacity of sesame research in the country  
  – enhance skill and knowledge of researchers  
  – develop infrastructure for sesame research  
• Multiply sufficient early generation seeds  
• Provide agro ecology based and suitable agronomic recommendations for different cropping systems including irrigation and conservation agriculture  
• Adopt/Develop mechanization technologies such as row planter, moisture conservation and drainage tools, and harvester  
• Conduct coordinated research and provide safe and integrated control methods against pests  
• Generate socio-economic information for efficient input utilization and increased competitiveness and impact |
| Input production, supply and distribution | • Build capacity of seed growers to forecast demand, and multiply, promote and distribute seed to farmers  
• Strengthen linkage among sesame seed value chain actors through contractual agreements  
• Strengthen community based seed production (CBSP)  
• Encourage Private sector in seed production and distribution  
• Introduce and strengthen seed quarantine system at the Ethio-Sudanese border |
<table>
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<tr>
<th><strong>On-farm production</strong></th>
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</table>
| ✓ Build capacity (skill, finance, linkages) of FCUs to provide inputs (seed, fertilizer, chemicals, machinery) to their members  
| ✓ Strengthen access of farmers and cooperatives to credit for inputs and labor  
| - Establish and strengthen RuSACCOs in sesame producing areas  
| - Strengthen the micro finance institutions to deliver input voucher service  
| - Establish Sesame credit Guarantee fund  
|  
| ✓ Make extension service accessible to all smallholder and commercial sesame farmers  
| - Develop sesame comprehensive manual and package  
| - Encourage the establishment of extension service providers for commercial farmers  
| - Build capacity of extension workers and farmers  
| - Increase use of ICT for dissemination of agricultural knowledge and information  
| - Strengthen research-extension linkage at different levels to speed up technology dissemination  
| ✓ Scale up best varieties and agronomic practices suitable for different agro ecologies  
| ✓ Strengthen performance monitoring and support for commercial sesame farmers  
<p>| - Revise and enforce the proclamation and directives relative to cropping system |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Actions</th>
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<tbody>
<tr>
<td>Expand sesame production</td>
<td>- Expand sesame production to all potential growing areas of the country</td>
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<td>- Build capacity for downscaled weather forecast and advisory service to sesame farmers</td>
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<tr>
<td>Post-harvest handling and agro processing</td>
<td>- Promote sesame post-harvest handling technologies among farmers and cooperatives</td>
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<td>- Create conducive environment for seasonal labor recruitment and management</td>
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<td>- Encourage export oriented sesame value addition</td>
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<td>- Make available good quality sesame in sufficient volume and at competitive price</td>
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<td>- Provide/develop appropriate infrastructure and logistic facilities</td>
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<td>- Create regional and national sesame multi stakeholder platform</td>
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To realize the sector vision and achieve the overall goal, the implementation process will require synergistic interactions amongst all stakeholders including policy level and other public actors, the various actors in the private sector, as well as the sesame farmers. An effective monitoring, learning and evaluation system should be in place to track progress and challenges during implementation based on agreed upon performance and impact indicators, and to take corrective measures effectively when the need arises. Therefore, the implementation of the strategic interventions should be done according to the time frame indicated in Figure 1.
Figure 1: Prioritization of interventions proposed in sesame value chain strategy
CHAPTER 1. INTRODUCTION

1.1. Purpose and Scope of the Strategy

Oilseeds are the mainstay of the rural and national economy in Ethiopia since they are the second largest foreign currency earner for the country after coffee and already more than 3.7 million smallholders are earning their living from oilseeds production (CSA, 2014). One of the major oilseeds for which Ethiopia is known in the international market is sesame. In the last few years, sesame production and marketing has shown very significant growth and there is considerable international market demand for Ethiopian sesame seed, and this is expected to increase. The increasing international market demand for sesame is not only evident in the rise of export volume but also in new buyers and sellers coming to the market. The traditional importers of Ethiopian sesame seed have been China, Israel, Turkey and Middle East countries. Currently, European countries and Japan are also importing Ethiopian sesame.

Despite the country’s immense potential to increase its production and productivity and significantly increase the international demand for sesame, a number of challenges hampered the development of sesame sector along the value chain. Consequently, the Ethiopian Agricultural Transformation Agency (ATA) in collaboration with the Ministry of Agriculture (MoA) and other key stakeholders has been tasked by the Agricultural Transformation Council to develop an integrated national strategy for the sesame sector. The main purpose of this strategy is to intensify the efforts of sesame sector development in line with the Growth and Transformation Plan II (GTP2) by understanding the major challenges of the sector and implementing strategic interventions. The strategy document is prepared to achieve sustainable improvement of sesame sector in terms of productivity, value addition and marketing, focusing on all actors along the value chain starting from research and farmers. This document will be used as a working document for the next five years and its implementation will be monitored on annual basis and will be refined further based on feedbacks from stakeholders as well as GTP2 targets.
1.2. Overview of the Sesame Sector in Ethiopia

Sesame (Sesamum indicum L.) is one of the oldest oilseeds known to human being with a wide production dimension extending from the tropics to temperate zones. Ethiopia has a long history of sesame cultivation. Some literatures indicate that sesame is an introduction to Ethiopia from the west around 300 BC. Since then, Ethiopian farmers have been growing the crop as a cash crop. Currently the crop has been expanding in its area coverage due to the presence of suitable agro-ecologies for the crop as well the rise of the profitability of the crop.

In Ethiopia, sesame is commonly cultivated in areas ranging in altitude from 500 to 1300 m above sea level in rain-fed condition. The low lands of Ethiopia adjoining the Sudan are the traditional sesame growing areas. Almost all of the sesame produce marketed in ECX comes from four administrative regions, namely Tigray, Amhara, Oromia and Benishangul-Gumuz (Figure 2). According to the Central Statistical Authority reports on area and production of sesame by small farmers and medium/large commercial farms (CSA 2013/14), the total production of sesame by both small farmers and commercial farms was 440 million tons in 2013. In 2014, there was a total of 420,495 ha sesame land cultivated by about 867,347 small-holder farmers in Tigray, Amhara, Oromia, Benishangul-Gumuz and SNNP regions and 276,701 ha of sesame land cultivated by medium and large commercial farms in Tigray, Amhara, Oromia, Benishangul-Gumuz, SNNP, Afar, Gambella regions. Tigray had the largest share of sesame production (41%), followed closely by Amhara region (40%). The share of Oromia and Benishangul-Gumuz regions was 10 and 9%, respectively. Recently, commercial farms in Afar region and small holder farmers in SNNP region have started producing sesame in significant acreages. Based on temperature and rainfall requirements of sesame, there are high potential areas in Afar, SNNP and Somali regions where sesame production can be expanded into (Figure 3).
Figure 2: Sesame production by regional State in Ethiopia in 2013/14 (CSA, 2014a and 2014b)
Ethiopia is one of the major sesame producing countries in the world, ranking 5th in production after Myanmar, India, China and the Sudan until 2010, according to FAO (FAOSTAT, 2015) (Figure 4). Recently, some African countries such as Tanzania, Mozambique and Mali have increased their sesame production aggressively by rapidly increasing their area and yield (Figure 5 & 6). Consequently, Ethiopia gave way its rank to Tanzania in since 2011 because of mainly decline in area. Ethiopia’s average yield is above the yield of most of the countries world average, though it is at par with that of Tanzania, and far below that of China. Sesame is one of the most important export crops for Ethiopia’s foreign currency earnings and for increasing the income of small farmers in the lowlands. It was estimated that 95% of the production is goes to the export market. The remaining 5% is used for local consumption and is limited to bakeries and confectionaries.

Figure 3: Potential areas for sesame production in Ethiopia
Figure 4: Yield of sesame in major sesame growing countries between 2007 and 2013
Figure 5: Sesame area, production and yield in the top 6 sesame growing countries in 2009 and 2013
Globally, sesame seed is chiefly used for oil extraction. The oil is colorless with distinctive nutty sweet flavor. Sesame oil is considered as prime vegetable oil in South East Asian dishes particularly in China and Japan (Wijnands et al. 2007). In addition, sesame is used in confectionery, tahini, halva, cosmetics and pharmaceutical industries (Anilakumar et al., 2010).

Sesame presents several benefits by being the source of: high content of Protein- even dietary protein; Vitamin B-complex which helps to improve the nervous system, organs, metabolism, eyes, muscles, skin and hair; Magnesium, Calcium, Iron and Copper- useful for red blood cell
production, bone mineralization, enzyme synthesis and hormone production; high fiber content; and high in mono-unsaturated fatty acid, oleic acid - lower bad cholesterol and increase good cholesterol in the blood and prevention of coronary artery disease and strokes.

In the last five years, sesame production has been declining. However, there is still high potential for increased production and meet the rapidly growing demand in the international market for Ethiopian sesame. In order to sustainably increase the production, it is necessary to make available improved varieties of sesame resistant to diseases and insect pests as well as improved crop management practices.

Until recently, sesame trading had been characterized by long value chains, which include producers, village traders or collectors, brokers/wholesalers, retailers and local consumers. Moreover, smallholder farmers had had a low bargaining power and depended on middlemen due to the small quantities sold and lack of market information system. This traditional sesame trading practice has now been transformed and, consequently, sesame is traded exclusively through the Ethiopian Commodity Exchange (ECX). Despite some operational problems that need to be addressed, the performance of sesame marketing in the ECX is so far very promising. All stakeholders, specifically small holder farmers and traders (suppliers) are well aware of the new market system and are fully involved in it. However, sesame production and marketing in Ethiopia still faces various challenges that need to be addressed. These include low level of productivity, poor quality, and underdeveloped market infrastructure among others. The absence of adequate road network, market information, and credit facilities are still major challenges which need to be addressed to improve the quantity and quality of sesame production and marketing.

1.2.1. Production trends

According to the Central Statistical Agency annual crop production reports, the production and area coverage of sesame hit record high in 2010/11 (Figures 7 & 8). Since then, area and
production had been declining and reached the lowest level in 2012/13, though there was an improvement in 2013/14.

Figure 7: Total Annual sesame Production in Ethiopia during 2009/10-2013/14 (CSA, 2009/10-2013/14)
Figure 8: Area coverage of sesame in Ethiopia during 2009/10-2013/14 (CSA, 2009/10-2013/14)
1.2.2. Trends of Ethiopia’s sesame export

The export of sesame both in volume and value has been consistently increasing in the last 17 years. Sesame is mostly exported in the form of raw seed and has been a major source of foreign currency for the country for many years following coffee. According to the Ethiopian Revenues and Customs Authority, Ethiopia exported 94,9541 tons of sesame and earned 1.7 trillion USD during the years 2009-2013 (Figure 9 & 10).

Source: ERCA (2009-2013)

Figure 9: Total Annual sesame export volume and value from Ethiopia during 2009-2013
Sesame has been exported through ECX since 2005 and currently 95% of sesame is exported through it mainly to low value markets. Sesame reaches the ECX from producers through three primary channels, namely farmers to cooperatives and then to ECX, farmers to traders in the primary transaction centers and then to ECX, or big farmers who sell directly in the ECX (Figure 11).

Figure 11: Ethiopian sesame trade channels

Ethiopia’s sesame export trend during 2009-2013 shows that the top 5 buyers of Ethiopian sesame are China, Israel, Turkey, Jordan and Saudi Arabia (Fig.7a). The country is highly dependent on the Chinese market which accounts for 61% of the value from sesame export. Israel is the second most important buyer with a share of 15%, followed by Turkey (6%).
1.3. Strategy Development Approach

The strategy was developed through a participatory and consultative process involving consultations with key stakeholders. The Ministry of Agriculture (MoA) and Ethiopian Institute of Agricultural Research (EIAR) played key roles in the process, with the Agricultural Transformation Agency coordinating the process. In general, over 25 stakeholders and a number of farmers were consulted as part of the process at kebele, woreda, zonal, regional and federal levels. Government institutions, Development partners, NGOs and other actors also provided input and feedback. In a nutshell, this sector development strategy is a result of rigorous multi-step process, as described below:

- **Extensive review of relevant literature**: The strategy development teams conducted an exhaustive review of existing reports published by local and international institutions, which provided a baseline understanding and starting point for the work. The team also undertook visits to all relevant research institutes to review the most recent research findings.

- **Multi-stakeholder meetings**: A meeting of stakeholders was held and numerous follow up discussions have been held with stakeholders since then. During the last few years, ATA has made efforts to engage key stakeholders in refining different aspects of the strategy, both through discussions and in practical engagements throughout the season.

- **In-depth discussions with key stakeholders**: Over 100 stakeholders from various institutions, including MoA, RBoA, woreda and kebele-level government staff, development partners, research institutes, traders, cooperatives, unions, farmers, MFIs, chemical suppliers, equipment manufacturers and others have been consulted in the strategy development process. The consultations helped to identify and validate the challenges in the system and interventions proposed in this strategy.
CHAPTER 2. VISION, GOAL AND STRATEGIC ISSUES

2.1. Overall Vision and Goals

We envision the sesame sector to be a key accelerator of economic development and growth in Ethiopia due to the crop’s high poverty alleviation potential for farmers, and foreign currency generation, and agro-industry development potentials for the country.

<table>
<thead>
<tr>
<th>Overall vision for Ethiopia’s sesame sector</th>
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<tbody>
<tr>
<td>To see Ethiopia being the leading sesame exporter with at least 25% of the global market share and tripling its foreign currency earnings by 2020 through enhanced productivity, quality, area expansion, and value addition</td>
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<table>
<thead>
<tr>
<th>Overall Goal</th>
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<tr>
<td>To enhance sesame production, quality, marketing and value addition.</td>
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</table>

2.2. Research and Technology Development

2.2.1. Strategic goal for research and technology development

The goal of research and technology development is to generate sesame technologies that improve the productivity and quality of sesame through a demand-driven and agro-ecology based approach and with shopping of ready-to-use technologies from countries with similar production system.
2.2.2. Systemic bottlenecks

**Improved varieties are not consistently developed across time and agro-ecologies**

Sesame grows in a wide range of agro-ecologies that have specific growing conditions and production. There are many production constraints that limit the productivity of sesame in Ethiopia such as insect pests and diseases, insufficient weed control, high levels of monocropping, shortage of improved varieties, lack of mechanisation, lack of appropriate use of agricultural inputs and shortage of labour during harvesting time and unrealised genetic yield potential (Wijnands *et al*., 2009).

The release of varieties is not consistent for sesame growing areas across time and agro-ecologies, resulting in only 2 varieties released in the last 33 years for the major growing areas of western Tigray and western Amhara where 80% of the sesame production comes from (Figure 12). Regardless of the release of 20 sesame varieties, most of the varieties released have not been adopted widely as they do not address the specific constraints of the respective agro-ecology and needs of farmers. Owing to lack of options, farmers are often forced to grow some of the varieties out of their ecology, leading to low economic returns to farmers.
Current sesame varieties used by farmers have suboptimal agronomic and market attributes

In most sesame producing areas, the varieties used by farmers lack some important agronomic traits such as high yield, early maturity, disease resistance, shattering and drought resistance and wide adaptability. Moreover, the varieties usually lose their quality traits like seed color, aroma, taste, oil content and 1000 seed weight through time after release due to inadequate procedures for maintaining genetic purity of the seed.
Recommended agronomic practices and pest management are not exhaustive and lack specificity

Research programs on sesame in Ethiopia have produced some recommendations regarding best agronomic and post-harvest management practices on topics including seedbed preparation, planting time and method, fertilizer application, irrigation practices, pest control, and harvest time. Although different agronomic and pest management practices have been developed by different federal and regional research centers, these recommendations are not exhaustive as well as not targeted to the specific agro-ecologies, this leads to the use of blanket recommendations leading to poor productivity and quality. For example, single recommendation of plant spacing (40 cm between rows and 10 cm between seeds) was given irrespective of difference in branching habit of the varieties and diversity of sesame agro-ecologies. Moreover, the fertilizer recommendation (100 kg/ha DAP and 50 kg/ha urea) is uniform across all soil types. There is no research recommendation on sesame cropping systems. Diseases such as bacterial blight and phyloidy and insect pests such as web worm and sesame seed bug are increasing in importance nowadays and hence integrated control methods should be developed and disseminated to end users.

Limited socio-economic information on sesame

Lack of adequate and timely information on socio-economic aspects such as production constraints and opportunities, gender roles and marketing along the value chain is also another challenge for sesame sector development. Systematic study on socio-economic aspects of sesame should be undertaken along the value chain. In the areas where sesame technologies are disseminated, adoption and impact studies are also crucial for future improvement of the sector.
2.2.3. Strategic interventions

Enhance sesame breeding efforts through modern tools of plant breeding to develop shattering and pest tolerant varieties with good market traits (color, oil, aroma, etc) and demonstrate them to farmers

Most of the national production of sesame comes from landraces which are less productive than exotic genotypes due to low level of resistance to biotic and abiotic stresses. This is due to the fact that improved varieties of sesame could not be consistently developed across time and agro-ecologies. Although the current sesame varieties have been released using the existing conventional breeding methods, such methods are time consuming and consequently improved varieties could not be made available as fast as they are demanded. In order to hasten the sesame breeding, modern tools of plant breeding such as biotechnology and genomics should be applied in the improvement efforts of the crop. Sesame breeding, in general, should be worked out towards the following objectives:-

- To broaden the genetic base of sesame through collection, introduction and hybridization.
- To accelerate sesame breeding through modern tools of breeding (biotechnology, marker assisted selection and genomics) that assist the conventional breeding.
- To develop high yielding and quality varieties through well designed breeding strategy
- To develop sesame varieties with better agronomic traits such as non-shattering, adaptable or tolerant to drought, diseases, insect pests and waterlogging.
- To adopt already finished technologies of sesame (varieties, crop management practices and mechanization etc) though introduction from abroad.

Although a number of varieties are released by the national agricultural research system, only three types of varieties which are usually called by the place where they are produced (Humera, Gondor and Wellega types) are well known in the market. In order to be competitive in the world market, we need more alternative varieties which are distinct, uniform and stable in terms of their type, growth habit and quality parameters. It is also necessary to maintain the
existing international market brand, the Humera type as an example, which has good uniformity, white seeds and good aroma and taste.

The sesame research should develop shattering tolerant sesame varieties through appropriate breeding techniques by maintaining the quality of Ethiopian sesame and minimize the post-harvest loss to increase income of household and the country.

**Build capacity of sesame research in the country**

The national sesame research has very poor capacity to conduct sesame research. The existing skilled human resource and infrastructure is very limited and hence the current research could not address the demand for sesame technologies and information. It is, therefore, necessary to strengthen the national sesame research in Ethiopia with regard to the following issues:-

- Enhance the skill and knowledge of sesame researchers through short and long term trainings
- Strengthen the infrastructure of the research through constructing laboratory facilities greenhouses, cold stores etc.
- Establish linkages with strong national sesame research institutes abroad
- Raise fund for sesame research by developing proposals for research projects
- Establish sesame sector development platform that involves stakeholders along sesame value chain

**Multiply sufficient early generation seeds**

Seed is one of the most important inputs for improving productivity of crops. Multiplication of early generation seeds plays a key role in production of sufficient pre-basic, basic and certified seeds. Therefore, the research should focus in multiplication of sufficient early generation seeds to have sustainable production and distribution of improved seed in the country.
Provide agro ecology based and suitable agronomic recommendations for different cropping systems including irrigation and conservation agriculture

Currently most sesame growing areas produce sesame with low inputs and poor agronomic practices. Agronomic practices are critically important to achieve optimum productivity. The combined use of appropriate cultivars in their recommended agro-ecology and improved agronomic practices could result in the exploitation of their maximum yield potential. It is essential to strictly grow a variety by applying suitable agronomic practices in order to get the maximum benefit.

It was realized that most of the agronomic recommendations for sesame are not agro-ecology specific and do not take into account the morphology of the varieties especially their branching habit. Lack of specificity is a challenge for attaining the optimum yield potential from the given variety. It is, therefore, necessary to conduct targeted agronomic research for the specific agro-ecology considering the soil type, rainfall pattern and prevailing cropping system. Similarly, while releasing new varieties, it is also vital to conduct agronomic recommendations side by side for that specific variety.

As mono cropping of sesame is dominating the cropping system in traditional sesame areas, there is a buildup of diseases and insect pests, and degradation of soil fertility that are threatening the sustainability of the system and increasing the production of quality sesame in most of sesame growing areas. Currently there is lack of recommendation on profitable crop combinations and the associated agronomic recommendations that can widen the alternative crops that can ensure steady income for farmers. Therefore, it is necessary to conduct systemic research on cropping system of sesame to avoid mono cropping of sesame.

In order to expand sesame production into irrigable areas of Afar, Somali, and other regions, encouraging and strengthening the research system to develop appropriate irrigation technologies (irrigation agronomy, irrigation frequency and interval, salinity management…) is urgently needed. The research system should also focus on developing appropriate irrigation technologies that support production of sesame under moisture-stress conditions in areas of low precipitation with supplemental irrigation.
Adopt/Develop mechanization technologies such as row planter, moisture conservation and drainage tools, and harvester

The sesame research system should give due attention to agricultural mechanization that increases labor efficiency and minimizes post-harvest loss for sesame producers. This includes small and medium sized tractors, walking tractors, row planters, cultivators, harvesters, cleaner, transport system (animal drawn carts and trailers), improved storage system, drying system, etc. Such modern sesame production scheme should be considered as a research agenda.

Conduct coordinated research and provide safe and integrated control methods against pests

Integrated pest management (IPM) is an ecosystem-based strategy that focuses on long-term prevention and control of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. The research system of Ethiopia should focus and develop appropriate sesame pest management technologies and scale up the available technologies to farmers through demonstrations and trainings. Some of the issues to be addressed in this regard are: i) conduct pesticides research (Identify internationally accepted pesticides for sesame, ensure implementation of guidelines on the ground, publish and disseminate up-to-date pesticide use data, ii) systematic research on major sesame pests (Bacterial blight, seed bugs, web worm and gall midge), and iii) conduct field trials to verify the proven crop protection technologies across sesame growing agro-ecologies of the country.
Generate socio-economic information for efficient input utilization and increased competitiveness and impact

After intensive researches and verification trials the Ethiopian institute of agricultural research released recommendations for different crops in different agro-ecologies of the country. Sesame is mainly grown in north western part of the country and mainly produces by medium and large investors. The fertilizer recommendation for sesame is 100kg DAP and 50 kg Urea per hectare. Even though, the investors are not willing to use the current recommended fertilizer rate for sesame production and their suggestion is we have different fertility status of investment areas for sesame and we need soil test based fertilizer recommendation. Therefore, it is necessary to conduct cost benefit analysis on fertilizer recommendation for sesame to break the suggestion of large and medium sesame producers.

Although preliminary studies on sesame value chains have been conducted, further studies are needed for Ethiopian sesame sector development. These studies should indicate the most beneficial channels in the value chains for maximizing benefits to sesame farmers and making the country competitive in the world market. The studies should also provide information on gender and other social issues.

Since sesame is an important export crop of Ethiopia, the production of the crop must be increased in order to maximize export earnings and supply the domestic processing industry through the development of improved sesame varieties and technologies. Sesame research has been focusing on developing new technologies to improve sesame productivity and quality. Nineteen sesame varieties have so far been released in Ethiopia. Despite efforts made to develop and disseminate a number of improved varieties, there is lack of comprehensive evidence on the adoption and economic impacts of improved sesame varieties. The rapid adoption of new improved sesame varieties could increase sesame productivity and contribute to overall export earning of the country. Studying the socio-economic factors that influence the adoption of improved sesame varieties in the major sesame growing areas should include the following points:- identify the available new sesame varieties in the sesame growing areas, sources of information on new sesame varieties, determine the extent to which the
farmers are aware of the improved sesame varieties, the influence of socio-economic characteristics of the farmers on adoption of improved sesame varieties and identify the problems confronting farmers’ adoption of new sesame varieties. Using the adoption information, it is also important to study the economic impacts of released sesame varieties in areas where sesame technologies were introduced.

2.3. Input Production, Supply and Distribution

2.3.1. Strategic goal for Input production, supply and distribution

- Increase knowledge and sustainable access of sesame farmers to quality inputs including improved seed of high yielding and disease resistant varieties, fertilizers, and pesticides with internationally acceptable residue levels
- Make available to sesame farmers sustainable and easily accessible input finance
- Increase access for farmers’ cooperatives and unions to finance for input delivery and output marketing

2.3.2. Systemic bottlenecks

Improved seed demand assessments do not accurately capture needs

Estimates of market demand for improved seed in Ethiopia are based entirely on official projections that are developed at the local (kebele) level and then transmitted through official channels to zonal and regional levels, after which they are aggregated nationally to produce estimates of the type and quantity (but not preferences for specific varieties or traits) of seed
that needs to be supplied in the coming season (Dawit et al., 2007). The result is a rough estimate of the types and quantities of seed that farmers want to purchase in the coming year in each region. The government allocates the available seed in proportion to the demand of the regions through the cooperatives, without considering shifts in demand due to changes in rainfall pattern and market situation. In many years, seed supply has been well below demand, because of either variation in the original estimates or supply bottlenecks. According to improved sesame seed demand assessments during the years of 2011-2012, it was not possible accurately to capture needs of improved sesame seeds and thus it was possible to address only approximately 30% of reported regional demand (figure 13).

Source: ESE, 2012-2013 Demand and Supply Assessment Report (MoA), ATA Team Analysis

Figure 13: Assessment of improved sesame seed demand, production and distribution
Weak sesame seed system

Seed is a basic input in farming and carry the genetic blueprint of a variety of superior traits such as high yield, disease tolerance, color etc. Until recently, sesame was not included in the Ethiopian Seed Enterprise’s portfolio, which is the public seed multiplication body at federal level in Ethiopia. Lack of access to quality or improved seed in turn has its own effect on the productivity and production of crops. In Ethiopia sesame varieties were registered since the 1970’s but provision of quality seed of these varieties though the formal seed system has not been reported until 2011. During this year, Ethiopian Seed Enterprise (ESE) initiated multiplication of sesame varieties and distributed 199 and 405 quintals of seed in 2011/12 and 2012/13, respectively. Although this is a good step towards production of high quality seed, it only covers <1% of the total area under sesame (figure 14). Currently, there is a big mismatch between the demand of sesame producers and the production and distribution improved seed in the country (Figure 15)
Note: It is assumed that a farmer owns 1 ha of land

**Source:** Ethiopian Seed Enterprise (Production 2007-2011), ATA Team Analysis

**Figure 14:** Improved sesame seed production of Ethiopian seed enterprise during 2007-2011
Poor capacity of farmer cooperative unions (FCUs) to supply inputs

Lack of capacity of finance and working capital in FCUs makes them unable to supply sufficient amount of inputs to farmers. This is due to the fact that farmer cooperative unions do not have access to adequate financial services, savings, credit or other financial instruments to supply agricultural inputs like improved varieties, chemicals, fertilizers and farm implements. FCUs have limited capacity to directly source chemicals from importers and lack the expertise in selection and quality control of pesticides. Consequently, there is a risk of adulteration, especially when purchasing through intermediaries.
Farmers rely on different sources to buy pesticides given that cooperatives do not have the capacity to effectively provide the product with a high risk of getting low quality and general-use chemicals that are not recommended for use in sesame production (Figure 16).

Source: ATA Team Analysis

Figure 16: Chemical distribution channels for farmers

**Limited access to input credit for sesame farmers**

One of the top challenges of the sesame sector in Ethiopia is access to finance and the high costs of credits via the informal money sources, which charge farmers exorbitantly high interest rates, both for inputs as well as for post-harvest handling and processing of sesame.
Studies indicated that informal credit is still a major source of finance, resulting in high costs of credit. Lack of adequate finance forces farmers to use minimal levels of inputs, and produce agricultural products in only small quantities. Sesame farmers suffer from lack of access to adequate finance especially in peak seasons when they need cash to purchase inputs and hire daily laborers for planting, weeding and harvesting. The dominant source of farm credit in Humera area in 2006 was shell (43%), followed by cooperatives (38%) and Micro Finance Institutes (14%) and finally banks (3%). Farmers mentioned that the amount of credit obtained from the cooperatives is not sufficient to cover all the operational costs of sesame production (Amare, 2009). Tefera (2010) suggested that farm output can increase by 13% if farmers’ access to credit increases with 1%.

2.3.2. Strategic interventions

Build capacity of seed growers to forecast demand, and multiply, promote and distribute seed to farmers

Although the informal seed system still plays a great role in the provision of seed in the country where the formal seed system supplies <1% of the demand, it is necessary to strengthen the formal seed system to enable them to produce sufficient amount of high quality seed. The capacity of the Ethiopian Seed Enterprise (ESE) and that of the regional seed enterprises in Amhara, Oromia and SNNP is under developed for sesame seed production and has to be enhanced in order to enable them effectively multiply and distribute improved seeds of sesame. Therefore, the formal seed system should be strengthened through:

Â Building the capacity of ESE/ RSE to multiply and distribute quality sesame seed sustainably including irrigation capacity
Encouraging cooperatives or private farmers to be involved in the formal seed system in collaboration with the public seed enterprises through training and financial supports.

Seed producers can be more effective in distributing their seed through direct seed marketing through multiple channels including the current retailers, the primary cooperatives, producer outlets, and independent seed stores. It allows increased access and timely availability of certified seed to farmers. The main advantages include:

1. Shortened seed supply chain from producer to user as minimal actors would be involved in the process, improving timeliness and convenience to the farmer.
2. No seed allocation restrictions on the selected woredas. Carryover seed is minimized, as the retail outlets would be able to return unsold seed back to seed enterprises.
3. Direct control is maintained over the quality of the product.

Infrastructure should be established for direct seed marketing, in which different actors including regional seed enterprises, the Ethiopian Seed Enterprise, private sector seed producers, and entrepreneurs are permitted and encouraged to establish separate end distribution points for the sale of improved seed (both publicly and privately produced) directly to farmers. Such a distribution method would incentivize timely distribution of seed in the quantity demanded by farmers, and would bring to bear the collective resources of different actors to address it.

Strengthen linkage among sesame seed value chain actors through contractual agreements

Different generations of seed (breeder seed, pre-basic seed, basic seed and certified seed) are produced by different actors in the seed value chain. Contractual agreements between the supplier and customer in the chain plays a great role in ensuring sustainable supply of starter seed and production of the required amount of certified seed needed by the farmers. The
producers can multiply and distribute the required amount of seed in quality and quantity at the specified delivery time. This arrangement is expected to ensure that critical decisions are made at the right time by each actor at each of the value chain.

Introduce/strengthen community based seed production

Community Based Seed Production (CBSP) is an approach to empower farmers to produce high yielding locally preferred improved seed from source seed through community farmers aiming to provide quality seed to buyers and market quality seed, boost local seed markets, open avenues for people to start seed-trading businesses, and offer farmers a 'basket' of crop varieties to choose from. CBSPs fill a big need for seed and farmers can get seed of the varieties they prefer. The communities may require support in a form of training, small infrastructure, equipment, technical backstopping, and coordination with other agencies.

The community based systems make use of the large variety of both locally improved varieties as well as seeds of improved varieties released by the formal system. Community based systems operate in between the informal and formal sector as they can introduce both improved varieties as well as proven, quality declared seeds of local varieties. They can grow up to small-scale seed enterprises through formalizing and standardizing quality procedures and protocols, and further integrating into seed markets. Such approach can be applicable for sesame which is relatively better than the informal in terms of provision of quality seeds which could be approved as Quality Declared Seed (QDS).
Encourage Private sector to participate in sesame seed production and distribution

The private sector plays an important role in seed production and distribution. Since the public formal seed system could not address the seed demand of most crops including sesame, the involvement of private sectors is very important. So there should be support from the government or the public seed enterprises to the private seed sector to involve them in multiplication of sesame seed. The support could be in terms of allowing them to access early generation seed, in certification and distribution of seed, in providing access to finance, organizing them in clusters, providing trainings on sesame seed production and post-harvest handling and provide supervision and technical support on seed production and distribution.

Introduce and strengthen sesame seed quarantine system at the Ethio-Sudanese border

Majority of medium and large investors located in north western part of the country use varieties released in the Sudan and rent large tracts of land for investment in the Sudan and bring their produce to Ethiopia without any quarantine. Moreover, some commercial farms bring seed from the Sudan to sow in Ethiopia without any quarantine certification. These practices have exposed the country to quarantine pests (insects, pathogens, weeds) of sesame. Therefore, introducing and strengthening seed quarantine system at the border is necessary to control the introduction of new pests of sesame in sesame production areas.
Build capacity (skill, finance, linkages) of Farmers Cooperative Unions to provide inputs (seed, fertilizer, chemicals, machinery) to their members

Farmers’ cooperative unions (FCUs) have been playing a significant role in the provision of fertilizer and seed to farmers in rural areas where private agro dealers are not available. However, shortages of technical, storage and financial resources are limiting them to cater for all the inputs and machinery needs of farmers in their area. Therefore, building the capacity of farmers’ cooperatives unions to deliver the required inputs and machinery can be one of the solutions to solve the problem. One of the avenues to solve the technical and financial constraint is linking the unions with companies that import and distribute the inputs and machinery who can supply them on credit basis. The unions should also have appropriate warehouse for chemicals and other inputs at their disposal.

Moreover, the technical capacity of unions, primary cooperatives and farmers should be increased regarding the basic principles of pesticide use on sesame and general pesticide handling, identification, use and disposal techniques and farmers rely on different sources to buy pesticides given that cooperatives do not have capacity to effectively provide the product.

Farmer cooperative unions play a great role in the supply and distribution of inputs (chemicals) to farmers. Therefore, the FCUs should be linked directly with agro-chemical importers that supply pesticides approved for use in sesame production.

Strengthen access of farmers and cooperatives to credit for inputs and labor

- Establish and strengthen Rural Savings and Credit Cooperatives (RuSACCOs)

Farmers need access to financial services to purchase inputs required for the implementation of the full package of sesame technologies. Rural savings and credit cooperatives are viable alternative to other financial sources to help farmers maximize household level investments. RuSACCOs offer two main financial services, namely savings and credits at lower interest rates, which other financial operators do not offer. Therefore, supporting and providing
incentives for farmers to form RuSACCOs can help them get finance during peak season within a short period of time. In areas where the RuSACCOs already exist, their scopes should be extended to involve more farmers in the system. Such schemes can fill gaps in especially poor areas where there is limited access to financial institutions. However, the RuSACCOs should be supported to strengthen their human and financial capacity. Rural Savings and Credit Cooperatives (RuSACCOs) should be strengthened and their mandate expanded to serve the role of a semi-dedicated financing institution for the cooperatives sector, and draw on the dedicated Cooperative Fund to lend to cooperatives at low interest rates.

- **Strengthen micro finance institutions to deliver input voucher service**

Options of financial services to farmers by MFIs should be extended to reach more farmers in an efficient manner. One alternative to improve the efficiency of the credit system is the use of input voucher system, which minimizes diversion of credit to other uses rather than input purchase. Input vouchers permit voucher holders to purchase specific quantities and types of farm inputs from qualified distributors who have agreed to accept vouchers as payment. The distributors in turn redeem the vouchers for cash payment from MFIs with an agreed margin to cover their expenses and agreed level of profit. This system would greatly improve the rate of repayment which is currently a big concern for financial institutions.

- **Establish Sesame Credit Guarantee Fund (SCGF)**

The collateral requirement of banks poses a serious challenge for sesame farmers seeking funding for inputs and farm operations such as planting, weeding and harvesting. In many countries around the world, credit guarantees are implemented as a partial substitute to conventional collateral. A guarantee fund is to secure a bank or any other lending institution against the default risks involved in lending to borrowers who cannot mobilize sufficient collateral. It is used as an instrument for enhancing credit in targeted sectors. Partial and full credit guarantee funds have existed since at least the beginning of the twentieth century, becoming more popular over recent decades (Das, 2013). Credit guarantee funds hold promise and provide attractive features for borrowers, financial institutions and policy-makers alike and are attracting growing interest as an instrument in development finance. Well-designed, well-funded and well-implemented credit guarantee system can improve farmers’ access to credit and their integration into formal financial markets; assist the farmers in obtaining finance for working capital, fixed assets
and investment at reasonable conditions; and enable them to improve their competitiveness and extend their economic activities. Initial funding could be sourced from stakeholders such as the government, banks, non-governmental organizations (NGOs) and donor agencies.

2.4. On Farm Production

2.4.1. Strategic goal for on farm production

- Increase awareness and adoption of best integrated crop and pest management and post-harvest handling practices
- Increase adoption of improved mechanization technologies by sesame farmers

2.4.2. Systemic bottlenecks

Farmers in major sesame areas have limited access to extension services

According to Central Statistical Authority (CSA, 2014a &b), 576, 425 hectares (299,724 ha by smallholder farmers and 276,701 ha by medium and large farms) were covered by sesame and produced 4.4 million quintals (2.2 million quintals from smallholder farms and 2.2 million quintals by medium and large farms) in 2013/14 cropping season. About 99% of the production is concentrated in four regions, Tigray, Amhara, Oromia and Benhangul Gumuz. But most of the farmers in these regions have limited access to extension services. Inputs like quality seeds, fertilizer and other complementary inputs and credit facilities for the farmers are not sufficiently made available for these farmers. In Amhara region, for example, the extension coverage in Quara woreda is only 9% of smallholder farmers although there is
relatively better extension service in Metema area (28%). Similarly, only 8% of smallholder farmers of Tsegede woreda in Tigray region and 9% of smallholder farmers of Diga woreda in Oromia region got extension service for sesame production. According to preliminary survey report (Figure 17), smallholder sesame farmers in Tigray region have more access to extension service than farmers in other sesame growing regions; 44% in Tahtay Adiabo and 34% in Kafta Humera. The study of Kinde Aysheshm (2007) showed that 42.5% of the sampled farmers in Metema area received extension services. In addition, the contact of development agents with producer farmers was not frequent and irregular. According to the findings of Sorsa Debela Gelalcha (2009) the services rendered were very limited. He revealed that no considerable extension service was provided by any responsible body to sesame farmers in Humera and Wellega.

Medium and large scale farms do not have any access to public extension services as they are expected to hire skilled human resource required for their operations. However, most of them have limited capacity to employ the required human resources and are therefore performing below smallholder farmers in terms of crop productivity. Consequently, their productivity is far less than that of the smallholder farmers. Amare (2009) indicated that sesame yield obtained by large scale farmers was 2.6 q/ha while that of smallholder farmers was 4.4 q/ha in 2006.
Access to extension service is critical to increase productivity and quality of sesame to enable the country to be competitive in the world market.

**Incomplete sesame production manuals for development agents**

The current sesame production manuals for DAs are incomplete across 4 key dimensions (Figure 18): 1) They are incomplete in geographic coverage, i.e. there is one recommendation for all agro-ecologies, 2) they are not market oriented, i.e. there is no recommendation tailored to end markets, 3) the manuals are not exhaustive, i.e. they do not cover all areas from production to consumption, and 4) they are not tailored to smallholder medium and large of farmers.

Source: CSA, Area and Cop Production (2013/14), AGP data (2009), ATA Team Analysis

Figure 17: Coverage of extension service in the major sesame growing regions of Ethiopia
Figure 18: Missing elements in the current sesame manuals for Development Agents (DAs)

Monocropping of sesame

Mono cropping is growing only one crop year after year on the same land. It has the following disadvantages; it can damage the soil ecology (including depletion or reduction in diversity of soil nutrients) and provide un-buffered niche for parasitic species, increasing crop vulnerability to opportunistic insects, plants, and microorganisms. The result is a more fragile ecosystem with an increased dependency on pesticides and fertilizers (Roslin, 2008).

According to Amare (2009) farmers prefer to cover almost all their land with sesame when the rainfall is good. Reason is that sesame has a high demand and an attractive market price.
According to him large investors mainly grow sorghum for the purpose of food for their workers.

In Ethiopia, mono cropping of sesame is the major production constraint that has led to decrease in productivity through increased insects and diseases pressure, infestation of weeds and decreased soil fertility.

**Sesame production is limited to a few potential areas**

Currently, Tigray and Amhara contribute 81% of sesame production in Ethiopian (CSA, 2014a & b). However, there are other regions with high potential for sesame production. Sesame (*Sesamum indicum*) is adapted to areas receiving annual rainfall ranging from 625 to 1100 mm and average temperature above 27 °C. The crop is tolerant to drought, but not to water logging and excessive rainfall. Sesame is well adapted to a wide range of soils, but requires deep, well-drained, fertile sandy loams. In Ethiopia such areas are abundant in Oromia, Afar, Somali, SNNP, Gambela and Benishangul Gumuz regions at altitudes ranging between 500 and 1500 m.a.s.l. Currently, the total area under sesame in 2014 was 576,426 hectares while there is over 2 million hectares of land suitable for sesame production.

**Climate change**

Sesame farmers in Ethiopia depend on rain-fed agriculture. Over time, they have adjusted their planting patterns and farming calendar to the onset, duration and end of the rainy seasons. However, with changing rainfall due to climate change, their planting patterns and farming calendar may no longer match seasonal rainfall distributions, which sometimes lead to crop losses. Seasonal rainfall forecasts are thus crucial for the provision of early warning information and enable farmers to adjust their planting times and optimize farm operations. Climate change has been manifesting itself in shifts in seasons and increased frequencies of heavy rainfall and associated flooding.
2.4.3. Strategic interventions

Make extension service accessible to all smallholder and commercial sesame farmers

Extension service is a key factor in increasing production, productivity and income of farmers. The government extension service, which is the main channel for smallholder farmers, should be strengthened through building the capacity of development agents. Moreover, alternative extension delivery channels such as private extension service providers, to support medium and large commercial farmers, extension service through contract farming with sesame processing companies, extension service by farmers’ cooperatives, should be implemented to ensure that each and every sesame farmer gets appropriate extension service.

- **Develop comprehensive manual and package**
  
The current sesame production manuals and packages are not complete in terms of geography, marketing, and applicability to large scale farms. Therefore, preparation of comprehensive sesame production manuals and packages would play a great role in the transformation of sesame production and marketing. During the preparation of the manuals and packages all relevant information such as agronomic practices, post-harvest handling and marketing for different agro-ecologies should be included and stakeholders in sesame value chain should be involved.

- **Encourage establishment of extension service providers for commercial farmers**
  
Extension service is a key factor in increasing production, productivity and income of farmers. Encourage establishment of extension service providers for commercial farmers, should be strengthened through building the capacity of experts and development agents. The extension delivery channels are such as private extension service providers, to support medium and large commercial farmers, extension service through contract farming with sesame processing companies, extension service by farmers’ cooperatives, should be implemented to ensure that each and every sesame farmer gets appropriate extension service.
Build capacity of extension workers and farmers on pre- and post-harvest management of sesame

Continuous theoretical and practical training of extension workers and sesame farmers on improved and proven sesame production techniques and post-harvest management contributes tremendously to increased productivity and quality. Hence, emphasis will be given to need based and timely training as means of transferring knowledge to extension agents and farmers. Moreover, capacity training of farmers and extension staff is necessary to tackle the problem monocropping which has become the dominant cropping system in major sesame growing areas. Rotating sesame with other crops especially mung bean, soybean, cotton or sorghum is important to decrease pest pressure and increase productivity of the crop; sesame yield can be increased by approximately 10% by using crop rotation. Leguminous crops such as mung bean and soy bean are preferable for rotation with sesame because they can improve the fertility of the soil as they can fix atmospheric nitrogen in symbiosis with rhizobium bacteria living in the soil or applied as bio-fertilizer. Farmers are not aware of the danger of mono cropping sesame and hence awareness creation on sesame cropping system is absolutely important in increasing production, productivity and income of sesame farmers.

Increase use of ICT for dissemination of agricultural knowledge and information

In Ethiopia, sesame is grown in semi-arid areas with sparse human population densities and inadequate infrastructure, which make extension service delivery more difficult for the conventional extension system than in the highlands. In such areas, information and communication technology (ICT) can play a critical role in facilitating rapid, efficient, and cost effective knowledge management. Currently, among the various ICT related initiatives, radio is widely used to share and inform users on agricultural issues, including new and upgraded farming techniques, production management, market information, and other issues. Due to its strategic importance in reaching the majority of the smallholders, attempts are being made to strengthen the delivery of knowledge and information through radio programs. Farm Radio International (FRI) is one best case in the use of ICT for agriculture (UNDP, 2012). Moreover, agricultural knowledge and information can be disseminated to farmers and extension agents through mobile phones interactive voice message (IVR).
• Strengthen research-extension linkages at different levels to speed up technology dissemination

There are various sesame technologies generated from federal and regional research centers, and universities. Such technologies are not sufficiently addressed to the users due to either little attention by the extension system or poor linkage of research and extension system. It is vital to establish linkage mechanisms to channel information from the source to the users. This requires systematic approach that enables the research and extension to meet their target beneficiaries. In the process, these linkage activities help to improve resource use by avoiding the duplication of effort and ensuring that critical tasks do not fall through the institutional cracks. The existing bottlenecks at farm level should be communicated to research through research-extension linkage forums for development of demand driven sesame technologies. Similarly, the available technologies of sesame in research centers should be demonstrated and disseminated to sesame farmers through the research-extension linkage mechanisms.

Scale up best varieties and agronomic practices suitable for different agroecologies

During the last ten years Ethiopian farmers have witnessed the advantages of the scaling up of improved agricultural technologies. Consequently, the production of cereals was increasing at a rate of 12% per year (Seme et al 2013). Of that increase 5% was due to increase in acreage and the rest was as a result of increase in productivity. For example, in 2000 the national average yield of potato was 4 tons/ha with total area coverage of about 30,000 ha (Gebremedhin and Taye 2013). In 2010 the yield was 8 tones/ha with a total acreage of about 300,000 ha. This is the result of increase in area, irrigation, productivity and distribution of potato tuber seed indicating the importance of scaling up of improved technologies.

The current sesame production comes almost entirely from traditional farming. The benefits of new varieties, improved seed, row planting, rotation, use of fertilizers, weeding, pest control methods, and harvesting are not well known by farmers. The advantages of quality on the
national economy should also be emphasized to growers. The sesame technologies available in the country should be scale up in existing and new production areas.

**Strengthen performance monitoring and support for commercial sesame farmers**

Sesame production management and productivity are higher in small holder farmers than medium and large commercial farmers. Medium and large commercial farmers have poor management and low productivity in the country and they do not well utilize their farm land. Therefore, the investment agency should strengthen performance monitoring of commercial farmers in utilization of their farm land properly for investment.

**Revise and enforce proclamation and directives related to cropping system**

The government should revise and enforce the proclamation and directives related to cropping system in order to reduce expansion of mono cropping in the country. Rotating sesame with other crops especially mung bean, soybean, cotton or sorghum is important to decrease pest pressure and increase productivity of the crop. Therefore, it is important to select and incorporate economically relevant and marketable pulses like Mung bean, soy bean and black gram in the document.

**Expand sesame production to all potential growing areas of the country**

Currently, sesame production is limited to some parts of the country. Tigray and Amhara regions are the major regions that contribute 81% of Ethiopian sesame production (CSA,
2014a &b). It should be promoted in all potential areas of the country in Oromia, SNNP, Afar, Somali, Gambella and Benishangul Gumuz regions.

Build capacity for downscaled weather forecast and advisory service to sesame farmers

Farmer-focused climate advisory services can improve the productivity of sesame if properly utilized in planning, decision-making and management of all farming operations. The advisory service may include choice of variety and other suitable crops, fertilizer, herbicides, irrigation, harvesting, etc.

2.5. Post-Harvest Handling and Agro Processing

2.5.1. Strategic goal for Post-harvest handling and Agro processing

- Increase awareness and access to improved post-harvest technologies
- Enhance value addition through provision of quality and sufficient produce, and appropriate agro-processing technologies

2.5.2. Systemic bottlenecks

Farmers in major sesame producing areas use poor post-harvest handling methods

Among the various challenges that the sesame sector faces in Ethiopia, post-harvest loss is one of the most pressing issues. Sesame farmers lose much of their sesame during the stacking and
threshing period. The loss does not stop there but continues to occur during the multiple loading and unloading activities, and transportation of the produce to storages at farm level or to aggregators and then to ECX. Loses also take place in storages due to pest damage, at marketing centers while taking samples for grading (buyers and sellers often pierce the sack to check the quality), during re-packing and processing. The sesame business network estimated that post-harvest loss across the sesame value chain may reach up to 30%.

**High post-harvest loss**

It is generally assumed that 30% of harvestable sesame is lost. Action research has been conducted to substantiate this claim. The study revealed that 13% losses occur, mainly at field level. Although the research did not cover all the important stages, this number represents a very important loss that is a value of more than 1 billion ETB (40 million Euro). The Sesame Business Network (SBN) Support Program is working in close collaboration with farmers and other stakeholders to reduce losses by 30% by the end of 2015 (SBN, 2004).

**Lack of coordinated labor management system**

Sesame production is highly labor intensive and requires massive labor force during weeding and harvesting. The yield of sesame can be reduced by more than half due to improper harvesting. Commercial sesame farmers spend a lot of time and resource searching for laborers.

In North West Ethiopia, hired labor (migrants) is commonly used. The peak demand for labor is during weeding (July and August) and harvesting (October). In most cases shortage of labor occurs during harvesting, with consequences on the quality due to early harvesting or yield loss due to late harvesting.
According to van der Mheen-Sluijter and Cecchi (2011), the overall cost of labor for harvesting and threshing varies depending on the availability of labor in the area. Especially during the first two weeding sessions, when it rains insistently and many laborers get malaria, wages rise dramatically. During the fieldwork in 2009, laborers in Humera were getting up to 80 or 90 Birr per day while the daily work price in Addis Ababa was 20 Birr per day. The high wages during harvesting and threshing time are a result of the fact that these have to be carried out within a short interval period after physiological maturity. It leads to high labor demands within a very short period and consequently higher wages. The low labor availability during weeding time is also the reason that almost half of the farmland may not be weeded on time or not at all. According to Amare (2009), there is high competition for labor between Humera and Metema. Basically the most important production cost for all sesame farmers is the casual labor cost.

An organized labor source in any form would save significant resources and time and contribute to production for commercial farmers. Uncontrolled weed growth in sesame fields can cause total yield loss. Harvesting time and method have great impact on final yield and quality of sesame. During weeding and harvesting times there is serious shortage of labor and hence the cost is unusually high.

**Underdeveloped value addition**

In sesame consuming countries, sesame is used for its oil and as confectionery. However, more than 95% of the Ethiopian sesame is exported raw (Figure 19). There have been some recent examples of market entry by some small to medium-sized companies producing tahini, sesame oil and hulled seeds. The process is quite capital intensive, using large and expensive machinery, which demands skilled operation and maintenance. Most of the countries that buy Ethiopia’s raw sesame make profits from importing cheap sesame and then processing it and re-exporting the export grade product (GIZ, 2011).
Ethiopia can more than double its income from sesame by exporting value added products such as hulled, toasted, roasted, and ground sesame, and oil. Sesame can be also exported in the form of tahini and halva.

![Levels of sesame processing and potential monetary values of different products](image)

**Figure 19:** Levels of sesame processing and potential monetary values of different products

In addition to the loss in monetary value incurred by exporting row sesame, the country is also losing the highly valuable animal feed that could have been obtained from sesame processing and used for boosting domestic livestock industry or for export. Moreover, exporting value added sesame products can reduce sensitivity to volatile international prices which sometimes affects the income of the country and that of the farmers. According to information gathered from the Ministry of Trade, there are more than 190 licensed exporters of sesame in Ethiopia. However, only three companies are actively engaged
in sesame value addition to the level of Hulling. These companies fully export their products to countries such as Japan, USA, Israel, Turkey, Dubai, Poland, Middle East, and European countries.

2.5.3. Strategic interventions

Promote sesame post-harvest handling technologies among farmers and cooperatives

Farmers need to be made aware of the high rate of return to their investment when they use appropriate sesame post-harvest handling technologies. Effective scaling up of best sesame post-harvest handling would help farmers understand that using recommended packages would result in increased productivity and production thereby improve their livelihood. Therefore, the following points be addressed to reduce post-harvest losses: provide continuous training on critical harvesting time and method, stacking, drying, threshing, cleaning, repacking, sampling techniques, transporting and storing, supervision and support; scale up/out proven post-harvest technologies such as plastic sheets for drying “hillas” (stakes), small transportation equipment’s, moisture testers, safe pesticides and their handling, hermetic plastic bags, etc.

Moreover, introduction and effective scaling up of best sesame post-harvest handling would help farmers understand that using recommended packages would result in increased productivity and production thereby improve their livelihood. Therefore, the following points be addressed to reduce post-harvest losses: provide continuous training on critical harvesting time and method, stacking, drying, threshing, cleaning, repacking, sampling techniques, transporting and storing, supervision and support; scale up/out proven post-harvest technologies such as plastic sheets for drying “hillas” (stakes), small transportation equipment’s, moisture testers, safe pesticides and their handling, hermetic plastic bags, etc.
Create conducive environment for seasonal labor recruitment and management

As availability of hired labor will continue to be a challenge in sesame production due to low level of mechanization and the shattering nature of the available varieties, an organized labor mobilization would save significant resources and time and contribute to increased production for commercial farmers. Therefore, the government should give more focus on labor management and provide conducive environment for labor mobilization from the highlands when needed by providing labor recruitment and management guidelines, and inspection services.

Development of labor management guideline for implementation plays an important role in mitigating shortage of seasonal labor in sesame production. The guideline would address such issues as housing, transportation, food & water, health, safety, etc. that can attract the workers to the area and protect their basic rights.

Encourage export oriented sesame value addition

The participation of local and international investors in sesame processing is limited despite efforts by the government to attract them. Sesame value addition targeting high value export markets is capital and technology intensive and needs the support of the government. Experiences of other countries show that preferential fiscal and non-fiscal incentives can be used to attract local and international investment including joint ventures (Azmera Andemo Kello, 2011). The encouragement can take the form of fiscal and non-fiscal incentives and establishing export processing zones.

Experiences of different countries show that fiscal and non-fiscal incentives are used by governments to attract investment in a particular area. As processed sesame has a big potential to increase the country’s foreign currency earning, its value addition should be encouraged by providing extended tax holidays, loans at lower interest rates for investment capital, higher
Encourage contract farming between processors and sesame farmers by providing legal framework, extension, tax and credit incentives

Contract farming plays a great role in meeting the quantitative and qualitative demands of agro processors for value addition. Currently there are three agro processing companies in the country. Even though, they are not engaged in value addition at their full capacity. Quality and quantity of sesame grain supply are some of the major reasons for their low level of value addition. Contract farming can ensure year round supply of sesame raw material at the required quantity and quality while ensuring sustainable market for farmers at a better price. Therefore, contract farming should be encouraged by providing legal framework to make sure that the two parties are protected, extension support to farmers, tax and credit incentives for the processors.

2.6. Marketing

2.6.1. Strategic goal for marketing

- Establish an efficient sesame supply chain linking sesame farmers through efficient aggregators to large and sustainable demand sinks
- Increase access to finance for sesame market actors including traders, cooperatives and unions
2.6.2. Systemic bottlenecks

Low quality and insufficient volume

Production of high-quality seed is fundamental to modern agriculture. Most annual crops are established each season from seeds, and seed quality can have a major impact on potential crop yield. Seeds can serve as the delivery system not only for improved genetics but also for new planting and production methods and crop protection strategies that improve the overall efficiency of agriculture and reduce its environmental impact.

Genetic purity refers to the percentage of genetic contamination with other varieties or species. The genetic purity of any commercial agricultural product propagated by seed begins with the purity of the seed planted. In general, the genetic purity of the seed planted must equal or exceed the final product purity standard required, as purity generally decreases with each subsequent generation of propagation.

It is virtually impossible to assure that no off-type plants or pollen is present in the seed production field and that all handling and conveyance equipment and storage facilities are completely free of contamination. As a result, commercial planting seed is seldom 100% pure.

In practice, practical seed genetic purity standards have been established by state seed laws and by seed certification agencies to ensure that the purchaser receives seed that is within certain purity tolerances.

Sesame export is dependent on quality. The major sesame quality parameters are color, moisture content (<7%), oil content (>50%) and purity (>99.5%). This requires that the seed must be produced free from any biological contamination and foreign matters. According to the Ministry of Trade, the production of sesame in the country is insufficient to meet the market demand for exporters. The value of agricultural export commodities such as sesame depends on pre-set standards. The revenue from export can be maximized either through increase in production or quality or both. According to ECX these standards are moisture %,
foreign matter, good natural color (white), objectionable odor and contrasting color. Grade 1 sesame is with value of moisture content 8% maximum and 1 % maximum for foreign matter, good natural color (white), objectionable odor and contrasting color. As the maximum % increases the grade also falls. In 2013, the amount of grade 1 sesame exported was 0.41 and grade 2 was 20.42 % of the total amount (ECX, 2013).

**Weak implementation of quality control system**

Quality is the most important factor to be competitive and sustain export market. The current produce in our country do not satisfy the quality standards for higher market to compete with other international sesame producers and exporters. This is due to the fact that implementation of quality control system in the country is not well developed and applied, practically to implement the quality standards of sesame. On top of that there are different factors that challenge the implementation of quality control system for sesame. These challenges include poor production systems (weeds, mixture of varieties having different colors etc), admixtures by farmers (such as sand, gravel, other crop seed, etc), unpleasant odor due to poor transportation (transporting in unhygienic manner) and no awareness creation about quality at all levels.

**Limited participation of Farmers’ Cooperative Unions (FCUs) in marketing**

Primary farmers’ cooperatives, unions and federations are participating in marketing of sesame. This may be the most likely avenue to attain maximum quality for export and exclude middle men from the value chain. Hence efforts should be made to involve primary cooperatives and unions in sesame production and export as it is in coffee. Farmers’ primary cooperatives and unions lack sufficient financial resources and technical knowledge for
storage construction and management, aggregation and marketing. Cooperative-direct-export channel is most suitable for reaching higher markets (figure 20).

**Weak market information and promotion service**

The current market information system in the country does not satisfy the demand of producers and exporters. Therefore, producers and exporters do not get the information of current world market price, end buyers requirements, potential buyers and production season and status of
competitors. Consequently, the producers, exporters and the country could not export their produce in quantity and at the right time to get the highest possible price.

The Ethiopian Pulses, Oilseeds and Spices Processors and Exporters Association (EPOSPEA), incepted in 1998 and registered in 2003, and has since made encouraging achievements in advocacy and export and investment promotion, despite its limited resources and capacity. Strengthening EPOSPEA with the necessary human and financial resources would enable the association to more effectively build markets and capacity for members, as well as serve as a vehicle for collaboration among public and private actors. In addition, farmers’ cooperative unions should be supported to promote their products using the internet and other media.

**Weak marketing competitiveness**

Marketing Competitiveness is the ability of a business to improve continuously marketing process capabilities and deliver better value to customers than competitors. It is the ability of a business to add more values for its customers than competitors and attain a position of relative advantage. It leads to a situation where a business has an advantage over its competitors by being able to offer better value, quality, and service.

Almost all pre- and post-harvest field operations of sesame production in Ethiopia are labor based, resulting in low yield per unit area and high cost of production. Moreover, infrastructure development in sesame production areas is very limited, thereby making transportation costs high. Furthermore, the Ethiopian sesame value chain has a lot to do to attain the quality requirements of high value international markets. The large majority of Ethiopia’s sesame export has been raw sesame. Diversification of sesame products through value addition with acceptable quality certification can improve its competitiveness. Consequently, price, quality and product diversification should be given high emphasis to make the country competitive in the world market.
Lack of coordination among actors in the sesame value chain

Lack of coordination among actors in the sesame value chain is an important bottleneck. Strong coordination is needed to meet the requirements of end buyers in terms of product quality, timely delivery, price, respecting contracts, etc and to avoid damage to brand reputation. The issues should be addressed at all points of the value chain starting from varietal and seed selection through farm operations, harvesting, processing, storage and transportation, which require coordination.

2.6.3. Strategic interventions

Make available good quality sesame in sufficient volume and at competitive price

The national sesame strategy is proposed to address the quality and quantity production of sesame in the country and to increase the household income of producers. There are many challenges on production quality and quantity of produce in sesame value chain. Interventions intended to address the bottlenecks are summarized below. The strategy should focus on the following points to increase the production of the crop in quality and quantity.

- The government should give due attention on quality and quantity production and regulations by developing policy strategy.
- Introduce and demonstrate good quality sesame production mechanisms and post-harvest handling techniques
- Support and provide appropriate storage materials and methods
- Participate model farmers in quality sesame production
- Introduce quality based payment
- Introduce contract farming
- Participate private sector and cooperatives and unions in sesame production
Provide trainings to agricultural experts, development agents and producers on quality sesame production and post-harvest handling.

**Strengthen the implementation of sesame quality control system**

The quality of sesame (purity, moisture content, oil content, color, size, aroma, pesticide residue, insects, traceability, etc) is very crucial in sesame marketing. Farmers and traders, however, blend sesame seeds collected from the major sources such as Humera, Gondor and Wellega. This decreases the overall value of the seed and lowers the price of the product. The existing quality control system is weak due to default in quality control implementation and weak infrastructure for quality. It is, therefore, important to enhance the quality control system by executing the standard quality parameters as set by ECX and national or international standards. Moreover, the decentralization of warehouses of ECX should be strengthened to maintain the purity of the seed and provision of the seed cleaning facilities up to 99.0-99.5% in order to create more added values in the export market.

The government should give due attention on quality and quantity production and regulations by developing policy strategy, introduce and demonstrate good quality sesame production mechanisms and post-harvest handling techniques, support and provide appropriate storage materials and methods, participate model farmers in quality sesame production, encourage quality based payment, strengthen contract farming, participate private sector and cooperatives and unions in sesame production, provide trainings to agricultural experts, development agents and producers on quality sesame production and post-harvest handling.

**Strengthen branding and promotion of Ethiopian sesame types**

Brand is a name, term, or symbol used to identify the product of a seller and differentiate it from products sold by competitors. Branded products are sold at much higher prices than
commodity products. Branding gives producers greater ability to set price. However, it requires high production and processing standards and product consistency. Brand labels can be registered as geographical indications or through a trademark system.

Sesame is grown in different agro-ecologies in Ethiopia with variable soil, rainfall, temperature regimes that can give rise to sesame types with unique taste and aroma. Although Ethiopian sesame is marketed with three brands, namely Humera, Gondar and Wellega types which are known by their own peculiar traits, there could be some more types that should be identified and promoted as brands. Such branding should be supported by scientific analysis. It is, therefore, vital to identify different brands and characterize them morphologically using descriptor list to identify them at field conditions as well as in terms of their organoleptic traits (aroma and test), oil content and fatty acid profile and genotypic ally. This information should be well documented and recognized as sesame specialty or banding of Ethiopia.

Available brands should be promoted by using different means such as online promotions, social media, demonstrations in trade fairs, etc. The main aim of market promotion is to ensure that customers are aware of the existence and positioning of products. Market assessment helps to understand our competitive environment and where our product fits in-it’s probably the most commonly requested service, to define our market, how it works, the current trends and opportunities, to identify future marketing activities and develop marketing skills. Higher government officials together with private company owners have the capacity to create mutual understanding between countries. This enables to boost export opportunity through establishing and strengthening trade relationship, to give trade guarantee, to build confidence, to solve trade problems. This can be facilitated through exhibitions, conferences, bilateral discussions and other methods by participating cooperative unions, producers, exporters and processors.

**Introduce traceability mechanisms and organic certification**

Farmers, postharvest handling operators, marketers, research practitioners and policy makers need good understanding of the concepts and implications of supply chain traceability to assist
in developing and implementing appropriate technological interventions to meet consumer demands for traceable agricultural supply chains. In addition that the government should develop and implement regulations and guidelines for traceability system in the country on sesame production, processing and marketing.

“Organic” is a labeling term for food or other agricultural products that have been produced according to the international organic regulations. These standards require the integration of cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. Most of the time sesame is produced in Ethiopia with low level of inputs and currently the product is expanding in new areas and thus Ethiopian sesame is organic product though it lacks certification. Although there are some initiatives of organic certification for sesame, the issue of organic certification in Ethiopia is not well developed. Due to this the opportunity of getting premium price for sesame in international market could not be captured. Therefore, the sesame sector will give due attention to the implementation of organic certification of sesame.
### Organic Certification Process

1. **Producer or handler adopts organic practices; submits application and fees to certifying agent.**

2. **Certifying agent reviews applications to verify that practices comply with organic regulation.**

3. **Inspector conducts an on-site inspection of the applicant’s operation.**

4. **Certifying agent reviews the application and the inspector’s report to determine if the applicant still complies with certifying agent organic regulations.**

5. **Certifying agent issues organic certificate.**

### Annual Recertification Process

1. **Inspector conducts an onsite inspection of the applicant’s operation.**

2. **Producer or handler provides annual update to certifying agent.**
Build financial and technical capacity of FCUs to export to existing market and new markets

Capacity building of cooperatives with financial and technical support to increase export volume to conventional market is one of the strategic interventions to increase the participation of farmers’ primary cooperatives and unions in sesame marketing. The strategy should focus on the following points to address the poor participation of cooperatives in conventional export market: enhance the timely repayment capacity of unions, encourage unions to establish RuSACCOs, provide technical support to primary cooperatives and unions in aggregation, marketing and financial management, link with reliable demand sinks to reduce risk and perform related quality control and build storage and cleaning facilities that meet higher value market requirements.

Currently, the share of Ethiopian sesame in the high value world market (USA, Japan and EU etc) is insignificant due to the stringent quality requirements. Income of the country and producers can be increased substantially by developing the capacity of cooperatives and unions to meet the high value market requirements. The following points will be given attention to enable FCUs to participate in high value markets: provide technical support to primary cooperatives and unions on quality, aggregation, marketing and financial management to participate in the high value markets, introduce organic certification and branding, strengthen management and entrepreneurial capacity of farmer cooperative unions, strengthen value addition of sesame to meet the high value market, and market promotion.

Build capacity to collect and disseminate local and international market information

Timely, accurate and transparent market information is important to address price volatility and become competitive in the world market. As far as is possible marketing decisions should
be based on sound information. Online and offline publications, agents and Ethiopian embassies can be used to get timely and accurate information from different countries. Much has been done to improve the dissemination of information in Ethiopia, particularly through efforts of regional governments and the ECX. Existing best practice mechanisms (e.g. ECX, regional marketing information systems) should be identified and used as channels to disseminate not only price data, but also other market intelligence data needed to improve linkages in the sesame value chain. Key steps include: collecting and triangulating market information data (e.g. price, demand and supply signals by region) make available from different sources (e.g. crop forecasts from partners, CSA, and regions); developing a simple, standard display of regional price, supply, and demand forecasts so farmers and aggregators can make informed buying and selling decisions; identifying current best practice information delivery channels (e.g. ECX, regional marketing information systems) and disseminating market information data, while simultaneously using the government network periodically, for example, posting information in kebele offices and FTCs. Therefore, scaling up of the information dissemination system is important to solve the current market information problems. Along with quality and input constraints market information was suggested to be a major constraint. However market information can be simplified using sesame market website that can be managed by a section in MoT. The website should show all necessary information timely. The second method can be using Interactive Voice Message by dialing 929, text message by dialing 934, and broadcasting information using radios. The use of mobile phones has paramount importance in information exchange. Unlike other technologies mobile phones have expanded very rapidly. Farmers use mobile phones to communicate with relatives and to obtain market price information.
Provide/develop appropriate infrastructure and logistics facilities

The government should provide conducive environment by developing infrastructure for sesame investment like storage facilities, market centers, availability of telecommunication networks, electric power, processing, road and transportation access that helps to address the current infrastructure bottlenecks in sesame value chain. Moreover, ECX should give attention to providing uniform grading and fast services across its centers to customers, which is currently taking about a week to unload truck carrying sesame and with complaints of consistency in grading.

Create Regional and National Sesame multi-stakeholder platforms

Coordination has been defined as managing dependencies between activities (Malone and Crowston, 1994). From a value chain perspective, it can be defined as the ability to provide direction and enforce instructions to other actors in the value chain. Coordination of the value chain is the act of making all stakeholders involved in the value chain in a well-organized way.

Inefficient coordination of value chains and its structure minimize level of production because of inaccessibility of market information and therefore farmers lack power to negotiate for better prices in order to capture reasonable share of price paid by consumers along the chain. Coordination structures may range from loosely-coordinated, market-based trading structures, to intensely coordinated, vertically integrated, production. The strong coordination and structure of sesame value chain can increase farmers’ access markets for their produces which in turn improve production and marketing efficiency of the products.

Multi-stakeholder platforms MSPs can play a critical role in facilitating the coordination of the sesame value chain. They bring together research centers, extension (MoA), FCUs, private sector, and donors with the objective of coordinating information sharing across institutions.
2.7. Summary of Bottlenecks and Interventions

This Strategy document has identified five stages of the sesame value chain, including: sesame research and technology development, Input production, supply and distribution, on-farm production, Post-harvest handling and agro processing, and market. At each stage of the value chain, several challenges were identified and strategies for overcoming them were synthesized into clearly defined, actionable interventions.

Table 4 below shows the full list of bottlenecks and interventions that will be undertaken, categorized by value chain step, in order to achieve the overall vision for the sesame sector. It is important to note that these interventions reflect list of actions to be completed to achieve productivity, profitability, and sustainability improvements in sesame production. These interventions can be summarized into their focus areas as follows:
<table>
<thead>
<tr>
<th>Value Chain Component</th>
<th>Goals</th>
<th>Systematic Bottlenecks</th>
<th>Strategic Interventions</th>
</tr>
</thead>
</table>
| **Research & Technology Development** | The goal of research and technology development is to generate sesame technologies that improve the productivity and quality of sesame through a demand-driven and agro-ecology based approach and with shopping of ready-to-use technologies from countries with similar production system. | • Improved varieties are not consistently developed across time and agro-ecologies  
• Current sesame varieties used by farmers have suboptimal agronomic and market attributes  
• Recommended agronomic practices and pest management are not exhaustive and lack specificity  
• Limited socio economic research in sesame | • Enhance sesame breeding efforts through modern tools of plant breeding to develop shattering and pest tolerant varieties with good market traits (color, oil, aroma) and demonstrate them to farmers  
• Build capacity of sesame research in the country  
  ○ Enhance skill and knowledge of researchers  
  ○ Develop infrastructure for sesame research  
• Multiply sufficient early generation seeds  
• Provide agro ecology based and suitable agronomic recommendations for different cropping systems including irrigation and conservation agriculture  
• Adopt/Develop mechanization technologies such as row planter, moisture conservation and drainage tools, and harvester  
• Conduct coordinated research and provide safe and integrated control methods against pests  
• Generate socio-economic information for efficient input utilization and increased competitiveness and impact |
| **Input access and distribution** | • Increase knowledge and sustainable access to quality inputs including high yielding and disease resistant varieties, fertilizers, and pesticides with internationally acceptable residue level  
• Make available to sesame farmers | • Improved seed demand assessments do not accurately capture needs  
• Weak sesame seed system  
• Poor capacity of Farmers Cooperative Unions to supply inputs (Seed, fertilizer, pesticides and farm tools)  
• Limited access to input credit for | Å Build capacity of seed growers to forecast demand, and multiply, promote and distribute seed to farmers  
Å Strengthen linkage among sesame seed value chain actors through contractual agreements  
Å Strengthen community based seed production (CBSP)  
Å Encourage private sector to participate in sesame seed production and distribution  
Å Introduce and strengthen seed quarantine system at the Ethio-Sudanese border  
Å Build capacity (skill, finance, linkages) of FCUs to provide inputs |
<table>
<thead>
<tr>
<th>On-farm production</th>
<th>Post-harvest handling and</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increase awareness and adoption of best Integrated crop and pest management practices</td>
<td>• Increase awareness and access to improved post-harvest handling</td>
</tr>
<tr>
<td>• Increase adoption of improved mechanization technologies by sesame farmers</td>
<td>• Farmers in major sesame producing areas use poor post-harvest handling methods</td>
</tr>
</tbody>
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<p>| | |</p>
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<tbody>
<tr>
<td>sustainable and easily accessible input finance</td>
<td>sesame farmers</td>
</tr>
<tr>
<td>• Increase access for farmers’ cooperatives and unions to finance input delivery and output marketing</td>
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82
| **agro processing** | • Enhance value addition through provision of quality and sufficient produce, and appropriate agro processing technologies | • High post-harvest loss  
• Lack of coordinated labor management system  
• Underdeveloped value addition | • Encourage export oriented sesame value addition  
• Encourage contract farming between sesame farmers and processors by providing legal framework, extension, tax and credit incentives |
| **Marketing** | • An efficient sesame supply chain, linking sesame farmers, through efficient aggregators, to large, sustainable demand sinks  
• Increase access to finance for sesame market actors including traders, cooperatives | • Low quality and insufficient volume  
• Weak implementation of quality control system  
• Limited participation of FCUs in marketing  
• Weak market information and promotion service  
• Weak marketing competitiveness  
• Lack of coordination among actors in the sesame value chain | • Make available good quality sesame in sufficient volume and at competitive price  
• Strengthen the implementation of sesame quality control system  
• Strengthen branding and promotion of Ethiopian sesame types  
• Introduce traceability mechanisms and organic certification  
• Build financial and technical capacity of FCUs to export to existing and new markets  
• Build capacity to collect and disseminate international market information  
• Provide/develop appropriate infrastructure and logistic facilities  
• Create regional and national sesame multi stakeholder platform |
CHAPTER 3. IMPLEMENTATION PLAN

3.1. Implementation Framework

This strategy identified the major interventions that need to be implemented to achieve the key goals of increasing productivity, overall production, marketing efficiency and incomes within the sesame sector. To ensure that the set goals are achieved in the set time, it is essential to categorize and prioritize the strategic interventions. Accordingly, based on the potential to result in high impact towards achieving the overall goal of the sesame sector, interventions are categorized as “high” “medium” and “low”. The same interventions are also categorized as short, medium and long-term based on the duration of time it requires for the intervention to produce results.

Table 4: Prioritization and sequencing of strategic interventions

<table>
<thead>
<tr>
<th>Value Chain component</th>
<th>Strategic Interventions</th>
<th>Impact</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Short-term (1-2 years)</td>
</tr>
<tr>
<td>Research &amp; Technology Development</td>
<td>Enhance sesame breeding efforts through modern tools of plant breeding to develop shattering and pest tolerant varieties with good market traits (color, oil, aroma) and demonstrate them to farmers</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Multiply sufficient early generation seeds</td>
<td>High</td>
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<td></td>
<td>Build capacity of sesame research in the country</td>
<td>high</td>
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<tr>
<td></td>
<td>− enhance skill and knowledge of researchers</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>− develop infrastructure for sesame research</td>
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<tr>
<td></td>
<td>Provide agro ecology based and suitable agronomic recommendations for different cropping systems including irrigation and conservation agriculture</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adopt/Develop mechanization technologies such as row planter, moisture conservation and drainage tools, and harvester</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td><strong>Input production, supply and distribution</strong></td>
<td><strong>On-farm production</strong></td>
<td><strong>Post-harvest handling and agro processing</strong></td>
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<tr>
<td>• Conduct coordinated research and provide safe and integrated control methods against pests</td>
<td>• Conduct coordinated research and provide safe and integrated control methods against pests</td>
<td>• Promote sesame post-harvest handling technologies among farmers and cooperatives</td>
<td></td>
</tr>
<tr>
<td>• Generate socio-economic information for efficient input utilization and increased competitiveness and impact</td>
<td>• Build capacity of seed growers to forecast demand, and multiply, promote and distribute seed to farmers</td>
<td>• Create conducive environment for seasonal labor recruitment and management</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>• Strengthen linkage among sesame seed value chain actors through contractual agreements</td>
<td>• Introduce and strengthen seed quarantine system at the Ethio-Sudanese border</td>
<td>• Encourage export oriented sesame value addition</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>• Strengthen community based seed system</td>
<td>• Strengthen community based seed system</td>
<td>• Encourage contract farming between sesame farmers and processors by providing legal framework, extension, tax and credit incentives</td>
<td></td>
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<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>• Build capacity (skill, finance, linkages) of FCUs to provide inputs (seed, fertilizer, chemicals, machinery) to their members</td>
<td>• Strengthen access of farmers and cooperatives to credit for inputs and labor</td>
<td>• Revise and enforce the proclamation and directives relative to cropping system</td>
<td></td>
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<tr>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>• Make extension service accessible to all smallholder and commercial sesame farmers</td>
<td>• Make extension service accessible to all smallholder and commercial sesame farmers</td>
<td>• Expand sesame production in all potential growing areas of the country</td>
<td></td>
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<tr>
<td>High</td>
<td>High</td>
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<tr>
<td>• Scale up best varieties and agronomic practices suitable for different agro ecologies</td>
<td>• Scale up best varieties and agronomic practices suitable for different agro ecologies</td>
<td>• Build capacity for downscaled weather forecast and advisory service to sesame farmers</td>
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<tr>
<td>High</td>
<td>High</td>
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<tr>
<td>• Strengthen performance monitoring of commercial farmers</td>
<td>• Strengthen performance monitoring of commercial farmers</td>
<td>• Promote sesame post-harvest handling technologies among farmers and cooperatives</td>
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<tr>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td></td>
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<tr>
<td>• Revise and enforce the proclamation and directives relative to cropping system</td>
<td>• Revise and enforce the proclamation and directives relative to cropping system</td>
<td>• Create conducive environment for seasonal labor recruitment and management</td>
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<tr>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>• Expand sesame production in all potential growing areas of the country</td>
<td>• Expand sesame production in all potential growing areas of the country</td>
<td>• Encourage export oriented sesame value addition</td>
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<tr>
<td>High</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>• Build capacity for downscaled weather forecast and advisory service to sesame farmers</td>
<td>• Build capacity for downscaled weather forecast and advisory service to sesame farmers</td>
<td>• Encourage contract farming between sesame farmers and processors by providing legal framework, extension, tax and credit incentives</td>
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<td>High</td>
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<td>Market</td>
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<tr>
<td></td>
<td>Make available good quality sesame in sufficient volume and at competitive price</td>
<td>High</td>
<td></td>
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<tr>
<td></td>
<td>Strengthen implementation of sesame quality control system</td>
<td>High</td>
<td></td>
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<tr>
<td></td>
<td>Strengthen branding and promotion of Ethiopian sesame types</td>
<td>High</td>
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<tr>
<td></td>
<td>Build financial and technical capacity of FCUs to export to existing and new markets</td>
<td>Medium</td>
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<tr>
<td></td>
<td>Build capacity to collect and disseminate domestic and international market information</td>
<td>High</td>
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<td></td>
<td>Provide/develop appropriate infrastructure and logistic facilities</td>
<td>Medium</td>
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<tr>
<td></td>
<td>Introduce traceability mechanisms and organic certification</td>
<td>High</td>
<td></td>
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<tr>
<td></td>
<td>Create regional and national sesame multi stakeholder platform</td>
<td>Medium</td>
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</tbody>
</table>
3.2. Approaches

3.2.1. Gender consideration

In the absence of gender analysis of the sesame crop, it is difficult to determine and propose strategic directions to address gender issues. Strategic direction using gender analysis is important to determine where to invest to create or widen existing opportunities thereby addressing systemic bottlenecks for women to efficiently and effectively engage and benefit from the production of the crop.

According to recently analyzed Agricultural sample survey data, only 4% of female householders cultivated the three major oilseeds in the country (i.e., Noug, linseed and sesame), which is 3 percent lower than male counterparts. Although the gender gap remains, nationally the percentage of sesame producers is increasing overtime with more significant increases in Tigray and Amhara region. Female holders are seen to also lag behind their male counterpart in size of land allocated for sesame production. Ethiopia’s sesame value chain study determined that women are marginalized in the control of sesame sales because they are excluded from marketing their production surplus (Kostka and Scharrer, 2011). Most research indicates that the productivity gap is between female holder and male holders are approximately 20% and 40%. Though yet to be verified for the sesame sector this will probably hold true given that productivity gap has been evidenced through many studies and one which was recently done based on CSA’s data as well.

In general, female holders have significantly fewer resources, access to technology, as well as fewer visits from extension agents. In addition, cultural norms and practices further reduce women holder’s productivity while there is still a need to understand the role, contribution and benefit share of married women. It is, therefore, important to consider the contribution of gender in sesame sector. Female farmers can benefit a lot from sesame value chain in terms of cultivation itself and employment. In lowlands such as Humera, and Metema sesame investment is the largest employer. In such cases females benefit considerably from employment during weeding, harvesting and cleaning etc. Sesame strategy goes along with the
government plan and policy of gender equality. The strategy gives equal opportunity with emphasis on children, women and male farmers in technology generation, dissemination and production.

### 3.2.2. EnvironmentaL sustainability

As the sesame follows modern cultivation methods using improved seeds of superior varieties, land races will be threatened. Therefore, the conservation of germplasm is required. Sesame farming requires utilization of pesticides for pest control in the field as well as in the store. Therefore, care should be taken to minimize the damage to the environment. Fumigation pesticides that are used in the storage facilities should be less persistent. Implementation of the strategy could have a negative impact if not well planned and implemented. Some of the negative impacts would include.

- Genetic erosion
- Salinity and acidity of soils as a result of improper irrigation methods in areas where irrigation is planned
- Prevalence of malaria and water borne diseases can be a problem in irrigated areas
- Land degradation as a result of clearing forests and bush lands to make space for sesame farming.

To address environmental issues in the course of the strategy implementation, the following would be considered:

- In situ and ex situ germplasm conservation
- Creating continuous awareness and monitoring of fertilizer and agro-chemical use to reduce environmental problems associated with it;
- Training of farmers on environmental issues related to irrigated agriculture;
- Training of technical staff on environmental issues so that they know the implication of irrigation development on environment;
Use of integrated water resource management (IWRM) approach in irrigation development to ensure equity distribution of water resources among different users;

Cumulative environmental impact assessment would be undertaken after every five years; and

Integrated pest management capacity building would be undertaken.

3.3. Partner Institutions

The key institutions along the sesame value chain are diverse with a very complex interconnectedness. Table 5 presents the key institutions in each of the components of the chain and categorizes them as lead and supporting institutions.
Table 5: Key actors in the sesame value chain

<table>
<thead>
<tr>
<th>Value Chain Component</th>
<th>Lead institutions</th>
<th>Supporting institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research &amp; Development</strong></td>
<td>EIAR, Universities, RARIs</td>
<td>MoA, RBoAs, International Development Partners, Private companies, Universities, MOFED, RBOFED, NGOs</td>
</tr>
<tr>
<td><strong>Input production</strong></td>
<td>MoA, RBoAs, ESE, RSEs, Research and rural technology centers, Universities, ESA</td>
<td>Private Companies, FCA, SMEs, Cooperatives, Unions, NGOs, International Development Partners, MOFED, RBOFED</td>
</tr>
<tr>
<td><strong>Input supply and distribution</strong></td>
<td>ESE, RSEs, MoA, RBoAs, Private companies</td>
<td>EIAR and RARIs, RSEs, FCA, Private companies, Cooperatives and Unions, NGOs</td>
</tr>
<tr>
<td>Section</td>
<td>Entities</td>
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</tr>
<tr>
<td>Research Cooperatives and Unions</td>
<td>International Development Partners, Financial institutions, Local administration, Agro-dealers, MOT, MOFED, RBOFED, Transport associations</td>
<td></td>
</tr>
<tr>
<td>On-farm production</td>
<td>MoA, RBoAs, EIAR and RARIs, Cooperatives &amp; unions, Local administration, EIAR and RARIs, NGOs, Financial institutions, International Development Partners, MOFED, RBOFED, National Meteorology Agency</td>
<td></td>
</tr>
<tr>
<td>Post-harvest handling and agro processing</td>
<td>MoA, RBoAs, EIAR and RARIs, Unions and cooperatives, Private enterprises, NGOs, ENHI, Universities</td>
<td></td>
</tr>
<tr>
<td>Market</td>
<td>Ministry of Trade, Ministry of Industry, CSA, ENHI, International Development Partners, NGOs</td>
<td></td>
</tr>
<tr>
<td>Ethiopian Standards Agency (ESA)</td>
<td>ECPA (Ethiopian Consumer Protection Agency)</td>
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<td>---------------------------------</td>
<td>--------------------------------------------</td>
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</tr>
<tr>
<td>MoA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FCA/RCPA</td>
<td></td>
<td></td>
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<tr>
<td>ECX</td>
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</tbody>
</table>
CHAPTER 4. MONITORING, LEARNING AND EVALUATION

4.1. Impact and Outcome Indicators

An effective monitoring, learning and evaluation system will be put in place to track progress and challenges during implementation and take corrective measures proactively when need arises. Especially, timely review of performance and resource utilization will be conducted based on agreed up on performance indicators and targets. Monitoring, Learning, and Evaluation rely on a results framework, initially articulated below, to track progress against goals. The results framework consists of indicators at the output, outcome, and impact levels. These results are expected to be achieved by 2019 and should directly result from interventions discussed in this document.

Table 6: Performance indicators

<table>
<thead>
<tr>
<th>Impact</th>
<th>Impact indicator</th>
</tr>
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<tbody>
<tr>
<td>Increased women and men farmers’ productivity</td>
<td>At least 100 % increase in average sesame yield (quintal/hectare) productivity by 2019 (from current 4 Qts / Ha to at least 8 Qts/Ha) At least 100 % increase in total sesame production by 2019 from 2.2 million quintal in 2014 to 4.4 million tons</td>
</tr>
<tr>
<td>Increased women and men farmers’ income</td>
<td>At least 50 % increase in farmers income from sesame production by 2019</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Out comes</th>
<th>Outcome indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Increased adoption of improved seed varieties, and appropriate agronomic practices by</td>
<td>At least 90 % of all sesame farmers used high quality improved seed varieties and appropriate agronomic practices by 2019 At least 90% of sesame farmers (including at least 30% Female-headed households) used best agronomic practices (including crop</td>
</tr>
<tr>
<td>Input/Output</td>
<td>Output indicator</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td><strong>Research and technology development:</strong></td>
<td>Performance of sesame research centers enhanced as a result of alleviating capacity limitations</td>
</tr>
<tr>
<td>• Sesame research centers capacitated</td>
<td>Technology output of sesame research centers improved by 25% (number of released varieties, agro-ecology-specific recommendations, and mechanized technologies)</td>
</tr>
<tr>
<td><strong>Inputs production and distribution:</strong> sesame farmers have increased knowledge of and access to affordable, reliable and sustainable sources of high quality improved sesame seed varieties, appropriate fertilizers, chemicals, farm implements and equipment tailored to specific agro ecologies</td>
<td></td>
</tr>
<tr>
<td>Increased in amount of high quality seeds and fertilizers packaged and distributed to farmers on time</td>
<td>Over 90% of sesame seed delivered to target woredas meets established quality standards by 2019</td>
</tr>
<tr>
<td></td>
<td>Over 95% of fertilizers delivered to target woredas meets established quality standards by 2019</td>
</tr>
<tr>
<td></td>
<td>At least 90% of improved sesame seed delivered in time to farmers by 2019</td>
</tr>
<tr>
<td></td>
<td>Volume of improved sesame seed supplied to farmers reached at least 80% of demand by 2019</td>
</tr>
<tr>
<td>Increased availability of input finance to sesame producers</td>
<td>At least 60% of sesame farmers in target woredas have access to at...</td>
</tr>
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</table>
sesame farmers | least 75% of their demand for input finance by 2019

<table>
<thead>
<tr>
<th>Output</th>
<th>Out indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-farm production:</strong> Sesame farmers have increased knowledge on and access to agronomic best practices (including row planting, harvesting, soil and fertility management, crop protection, crop rotation etc)</td>
<td>Increased in number of farmers exposed to agronomic best practices through training, on farm demonstrations, experience-sharing learning  At least 90% of sesame farmers in target woredas (including 30% of FHHs) receive training, experience sharing learning and demonstration on benefits of use of best agronomic practices in major activities from land preparation to harvesting and storage by 2019</td>
</tr>
<tr>
<td><strong>Post-harvest processing:</strong> Increased knowledge of and access to post harvest processing facilities and practices by sesame farmers</td>
<td>Number of farmers with access to adequate storage facilities and Practices  At least 80 % of sesame small holder farmers in high potential areas have access to adequate on-farm and off-farm storage facilities and improved postharvest handling practices by 2019</td>
</tr>
<tr>
<td><strong>Marketing:</strong> Increased access to sufficient and reliable markets for sesame SHF outputs</td>
<td>Cooperatives and other output aggregators have increased access to sesame output financing  90% of sesame aggregators have access to at least 60% of their output financing needs by 2019</td>
</tr>
</tbody>
</table>
CHAPTER 5. POTENTIAL CHALLENGES IN THE IMPLEMENTATION OF THE STRATEGY AND MITIGATION MEASURES

Institutional challenges: As discussed in the strategy, the sesame value chain is so complex and involves different institutions, often with competing interests. Even within government institutions bringing every stakeholder to a common and concerted action towards achieving the goal would remain one challenge. This challenge needs to be tackled through institutionalizing platforms where all stakeholders can have a say in planning and implementation. Diligence in implementing the monitoring and learning aspects as outlined in the strategy would also be an additional tool in mitigating the potential impacts that may arise from this challenge. The overall GTP goal is also one powerful tool to guide the actions of key stakeholders.

Make availability and allocation of required resources: Most of the interventions suggested to address the systemic bottlenecks along the components of the sesame value chain require considerable financial and human resources. Research institutions need massive resources to undertake complex researches to address issues like developing shattering resistant sesame varieties. This would require massive investment in infrastructure development. The extension service as well requires similar massive resources to proactively support the sesame sector.

The private sector would also require massive resources for various activities including among others, finance for output aggregation and processing, as well as for infrastructure development (storage, transport…). Mitigation of these challenges, in addition to what the government can and should do, may also require involving active engagements with donors and development partners.
Climate related challenges may impede the achievement of set goals: The unpredictability of the rains with the resultant undesired effects would remain a serious challenge in the achievement of the set goals. Mitigating these challenges rests on careful planning and mainstreaming climate issues in the planned interventions by all concerned.

Effective gender mainstreaming may remain a serious challenge: While the significance of liberating the tied power and resources that exists with women is discussed at length in the strategy. Translating this into effective results may still remain a serious constraint towards achieving the set goals of the strategy. Though the roots of this challenge remains deeply rooted in the society at all levels, sustained efforts to institutionalize gender mainstreaming in all plans and interventions should be the way forward.
CHAPTER 6. SESAME SECTOR STRATEGY REVIEW

Sesame Sector Strategy Review Committee
This sector strategy is planned as living document that provides meaningful and impactful guidance to sector participants to realize the vision for the sector as a whole, and for each of the identified components. For this goal to be achieved there needs to be a structured way to review this strategy on a periodic basis, and improve on it based on lessons learnt and changing realities within the sector.

It is therefore envisioned that a sesame Sector Strategy Review Committee will be constituted to update this strategy on an annual basis, and convene other sector participants to discuss progress made; lessons learnt and planned activities in the coming years.

The members of the sesame Sector Strategy Review Committee would be from the following institutions:
1) Ministry of Agriculture
2) The Ethiopian Agricultural Transformation Agency
3) The Ethiopian Institute of Agricultural Research
4) Ministry of Trade
5) A representative from the Public Seeds Enterprises
6) A representative from the Federal Cooperatives Agency
7) A representative from the Private sesame Sector
8) Two representatives from Multilateral and Donor Organizations with significant activities in the sesame Sector

The sesame Sector Strategy Review committee would meet at least once annually, and will have the responsibility to update the sector strategy on an annual basis. They would also organize annual sesame Sector Review Meeting.
Annex 1: Major Stakeholders of the sesame Sector

Ministry of Agriculture
The Ministry of Agriculture (MoA) is responsible for developing and coordinating the implementation of the overall national agricultural development policies and strategies, with input and support from the regions and other stakeholders. The ministry is also responsible for developing extension packages for newly developed technologies and disseminating those through its extensive extension networks.

Regional Bureaus of Agriculture
The Regional Bureaus of Agriculture (RBoAs) are responsible for coordinating and leading agricultural development in their respective regions. RBoAs develop extension packages and provide support to zonal and woreda offices of agriculture in delivering extension services. They also facilitate coordination and alignment across development partners to ensure coordinated agricultural development services are delivered at the zonal and woreda level.

Research Institutions

EIAR and RARIs
The Ethiopian Institute of Agricultural Research (EIAR) and the Regional Agricultural Research Institutes (RARIs) have the mandate to generate, adapt and promote agricultural technologies that are required to enhance agricultural productivity. These institutes play key roles in the development, release and promotion of improved technologies (including improved varieties, recommended agronomic practices and farm implements) and up-to-date information. They are also responsible for multiplication and supply of early generation seed (breeder and pre basic seeds). In addition, EIAR is responsible for the coordination of nationwide research, while the RARIs have the responsibility to conduct targeted research and develop mainly region-specific technologies and recommendations.
EIAR manages a number of federal research centers, each mandated to work on a specialized set of agricultural research subjects. The national sesame research is coordinated from Humera agricultural research center (under TARI). Other research centers involved in sesame research include, Werer, Gonder, Pawe, Bako, Gambela and jigjija and higher learning institutes including Mekelle, Axum, semera, Gondar, Jigjiga and wollega universities amongst others.

In addition to the crop research centers, there are agricultural mechanization research centers such as Asella, Bako, Melkasa, and Bahirdar which focus on the production of agricultural machinery prototypes and testing imported machineries.

**Ethiopian Agricultural Transformation Agency (ATA)**

The ATA is an initiative by the Government of Ethiopia (GoE) with the primary aim of promoting agricultural sector transformation by supporting existing structures of government, private-sector and other non-governmental partners to address systemic bottlenecks and deliver on a priority national agenda to achieve growth and food security. ATA’s overall mandate is to address systemic bottlenecks in the agricultural sector by supporting and enhancing the capability of the MoA and other public, private, and non-governmental implementing partners, with the ultimate objective of improving the livelihoods of sesame farmers.

The ATA, with its partners, is currently working in systemic bottlenecks identification and formulating solutions; implementation support to provide project management, technical assistance, and knowledge sharing; capacity building to strengthen key public, private, and civil society partners to ensure sustainability of interventions; and coordination to enhance linkages and coordination among stakeholders in high priority areas to reach agreed-upon milestones and objectives.

**Ministry of Finance and Economic Development (MoFED)**

Formulates development policies, plan and budget; mobilize and administer external resources; and institutes efficient and effective accountable public finance and property
administration and controlling system. It has a major stake in sesame production through its influence in policy making and resource allocations.

**Federal Cooperative Agency (FCA)**

The Federal Cooperative Agency develops and enforces federal cooperative regulations. It works towards creating enabling environment for various types of cooperatives in the country. It plays key role in the sesame sector through its influence in providing the enabling environment for the development of effective and competitive cooperatives and unions involved in the sesame sector.

**Higher Learning Institutions (HLIs)**

There are over 30 universities and colleges currently in operation in the country. Many of the older ones such as Haromaya University, Mekele University, Hawassa University, Bahir Dar University, Ambo University and Jimma University have agricultural colleges engaged in agricultural research and extension, mainly addressing priority constraints in the regions where they are located.

**Institute of Biodiversity Conservation (IBC)**

IBC is a federal government institute with mandates to ensure: (1) conservation of biodiversity, (2) sustainable utilization of resources, and (3) access to and sharing of benefits of biological resources. In the case of crops, IBC maintains a gene bank for the preservation of indigenous land races. IBC is a close ally of the research system in the identification, development and maintenance of improved varieties. It is also a key partner in the identification and management of risks associated with widespread technology adoption.

**Seed Enterprises**

The Ethiopian Seed Enterprise (ESE) and Regional Seed Enterprises (RSEs) in Amhara and Tigray regions a representative of ESE are playing a role in seed production and distribution. In general, seed enterprises exercise the dual mandate of implementing the government’s
target of producing sufficient quantities of improved seed for key crops including oil seeds like sesame, while functioning as independent profit making businesses.

**Ethiopian Seed Growers and Processors Association**
Strives to strengthen the seed system in the country by playing a coordination role in the formal seed sector (Private, public…), and plays advocacy roles in policy formulation (seed law) based on ISTA (International Seed Testing Agency) models.

**Agricultural Input Supply Enterprise (AISE)**
The Agricultural Input Supply Enterprise has the primary responsibility of importing and distributing critical agricultural inputs including fertilizers.

**National and Regional Soil Testing Laboratories**
They support the extension service through undertaking various soil analysis works. They also provide service to the private sector. There are 18 laboratories including the National Soil Testing Laboratory located in Addis Ababa, and the remaining 17 spread in 7 regions.

**Farmers**
Farmers, both small and medium/large sesame farmers, are the ultimate owners of and beneficiaries from this sector strategy.

**Commercial and state farms**
In realizing the overall vision for the sesame sector, these farms would have significant contributions. These farms also play major roles in expanding mechanized sesame production.

**Primary Cooperatives (PC) and Cooperative Unions (CU)**
Agricultural cooperatives have an important role to play in addressing the needs of smallholder farmers, including providing inputs and output marketing services.
The Ethiopian Commodity Exchange (ECX)
ECX is an organized marketplace, where buyers and sellers come together to trade - assured of quality, quantity, payment, and delivery. ECX at the moment trades mostly coffee, sesame and pulses.

Private sector
The sesame value chain can benefit from private sector investment and participation. The sector can play lead role in the production and distribution agricultural inputs; in the import, export, production, and distribution of post-harvest machinery; mechanization service delivery, and agro-processing and marketing. Such participation can be achieved through a variety of business models, including Public-Private Partnerships (PPP).

Other relevant ministries
The Ministry of Trade (MoT): Is a key stakeholder in the domestic and export marketing of sesame. As the country is striving to expand sesame export to conventional and higher market, the ministry plays key role in developing and implementing policy interventions that facilitate the production and marketing of sesame.

The Ministry of Industry (MoI): Has a mandate to support the development of agro-processing industries, through providing enabling policy environment.

The Ministry of Foreign Affairs (MoFA): Contributes towards the promotion of the country’s agricultural potential in international platforms to attract more Foreign Direct Investment (FDI).

The Ministry of Women, Children and Youth Affairs (MoWCY): Has a mandate to promote gender mainstreaming to improve women’s participation in overall national
development. It can play key roles in addressing gender issues in the agriculture sector, including in sesame production and marketing.

**National and regional Projects working on sesame**

**AGP (Agricultural Growth Program):** The Agriculture Growth Program (AGP) is a multi-donor funded comprehensive program anchored in the Ethiopian government’s focus on increasing sustainable agriculture growth. As a major component of the government’s five-year Growth and Transformation Plan (GTP) and a potential extension well into next GTP, AGP complements existing programs, and promotes agricultural growth in targeted, potentially rich, but underdeveloped woredas of the country.

**Sesame business network,** Agribusiness and Market Development (AMDe) project in AGP woredas, led by implementation partner ACDI/VOCA, Agriteria and SNV are an NGOs which works in close collaboration with regional agricultural research centers and RBoA in Ethiopia in sesame value chain.

**Financial Institutions**

**Commercial Bank of Ethiopia**
The Commercial Bank of Ethiopia (CBE) is the largest commercial bank in Ethiopia with assets of 158.11 billion Birr as on June 30th 2013. With its extensive network and huge resources, the bank can play indispensable role in addressing the financial needs along the sesame value chain.

**Other Financial Institutions**
Other financial institutions including banks, credit and savings institutions, other MFI’s and Rural Savings and Credit Organizations, etc. all have a significant role to play in enabling financial access to sector players for inputs, output financing and equipment purchases. Major institutions in this regard include Dedebit saving and credit, Amhara Credit and Savings Institution (ACSI), Oromia Credit and Savings Share Company (OCSSCO), Omo Micro Finance (OMO).
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