VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

agrinatura for European Commission

Value Chain Analysis of sesame in Somalia

Nicodème Nimeya
Margarida Lima de Faria
Ieben Broeckhoven
Abdinasir Yusuf Muhumed
Abdhullahi Maaliin Dahir
Ibrahim Abdilahi
Ismail Kukay

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Agrinatura is the European Alliance of Universities and Research Centres involved in agricultural research and capacity building for development.

The information and knowledge produced through the value chain studies are intended to support the Delegations of the European Union and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions

VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: https://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d_en

Team Composition

Economist: Nicodème Nimenya

Social expert: Margarida Lima de Faria

Environmental expert: Ieben Broeckhoven

National experts: Abdinasir Yusuf Muhumed – economic analysis

Abdullahi Maaliin Dahir – social analysis

Ibrahim Abdilahi – environment analysis

Field work facilitator: Ismail Kukay

Technical advisor appointed by the MoAI: Mustafe Waayeel

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Notwithstanding the above, the conclusions, views and recommendations stated in this report are those of the authors and do not necessarily represent the views of EC INTPA-F3 or the EU Delegation in Somalia.

STUDY LIMITATIONS

The data collected for the study met its objectives. However, due to travel and security restrictions that limited access to value chain actors in all sesame-producing regions, the study covered only three of the four regions, with Jubaland not included. For the same reasons, value chain actors from Afgoye were interviewed in Mogadishu, while those in Baidoa and Jowhar were interviewed in town centres rather than in their operational areas. Additionally, the respondents trust was also a sensitive issue, which had to be handled carefully by the national team.

Additionally, Somalia faces a severe shortage of reliable economic and social statistics. This limitation was partially addressed through consultation of available secondary data.

ACRONYMS

AFA	AgriFood chain Analysis
AEZ	Agro-ecological Zones
AU	African Union
B/C	Benefit/Cost
BRCiS	Building Resilient Communities in Somalia
CAHW	Community Animal Health Workers
CBO	Community-based Organisations
CEFA	Comitato Europeo per la Formazione e l'Agricoltura
CIMMYT	International Maize and Wheat Improvement Centre
CFS	Committee on World Food Security
CoLEAD	Committee Linking Entrepreneurship-Agriculture-Development
CSA	Climate-Smart Agriculture
DAP	Diammonium Phosphate
DWCP	Decent Work Country Programme
EU	European Union
EUD	European Union (country) Delegation
FAO	Food and Agriculture Organisation of the United Nations
FAOSTA	FAO Statistical Database
FAO–SWALIM	FAO – Somalia Water and Land Information Management
FGD	Focus Group Discussion
FGS	Federal Government of Somalia
FMoAI	Federal Ministry of Agriculture and Irrigation of Somalia
FNS-REPRO	Food and Nutrition Resilience Programme
FRS	Federal Republic of Somalia
FSNAU	Food Security and Nutrition Analysis Unit
GAP	Good Agriculture Practices
GDP	Gross Domestic Product
GEEL	Growth, Enterprise, Employment and Livelihoods
HIPC	Highly Indebt Poor Country
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
IDP	Internally Displaced Populations
IGAD	Intergovernmental Authority on Development
ILO	International Labour Organisation of the United Nations
IMCC	Inter-Ministerial Coordination Committees
INGO	International Non-Governmental Organisation
INTPA	Directorate-General for International Partnerships
IPC	Integrated Food Nutrition Phase Classification
IPM	Integrated Pest Management
IPRS	Interim Poverty Reduction Strategy
IRC	International Rescue Committee
IRAC	International Resistance Action Committee
ISPI	Italian Institute of International Political Studies
IWRM	Integrated Water Resources Management
JOSP	Jowhar Offstream Storage Programme
KII	Key Informant Interviews
LCA	Life Cycle Assessment
MoAI	Ministry of Agriculture and Irrigation of Somalia

MoECHE	Ministry of Education, Culture and Higher Education
MoEWR	Ministry of Energy and Water Resources of Somalia
MoPIED	Ministry of Planning, Investment and Economic Development of Somalia
MOPWH&R	Ministry of Public Works, Reconstruction & Housing
NAIP	National Agriculture Investment Plans
NGO	Non-Governmental Organisation
NOP	Net Operating Profit
NPK	Nitrogen, Phosphorus, Potassium
NRC	Norwegian Refugee Council
NRM	Natural Resources Management Committee
NWRS	National Water Resources Strategy
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
RoT	Return on turnover
SAE	Small Area Estimates
SARP	Somali Agriculture Riverine Programme
SATG	Somalia Agriculture Technical Group
SCALA	Scaling up Climate Ambition on Land Use and Agriculture
SHEDU	Shabelle Education Umbrella
SIHBS	Somalia Integrated Household Budget Survey
SMoAI	State Ministry of Agriculture and Irrigation of Somalia
SNBS	Somalia National Bureau of Statistics
SomRep	Somalia Resilience Programme
SSA	Sub-Saharan Africa
SSGA	Sesame Seed Growers' Association
STAG	Somali Agriculture Technical Group
SWALIM	Somalia Water and Land Information Management
SWDC	Somali Women Development Centre
TSP	Triple Superphosphate
UNDP	United Nations Development Programme
UNEP-DHI	United Nations Environmental Programme – Centre on Water and Environment
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USDOL	United States Department of Labour
VCA	Value Chain Analysis
VCA4D	Value Chain Analysis for Development
VDC	Village Development Committee
VGGT	Voluntary Guidelines on Responsible Governance of Tenure of Land, Fisheries and Forests
VSLA	Village Saving and Loans Associations
WB	World Bank
WEAI	Women Empowerment in Agriculture Index
WFP	World Food Programme
WHO	World Health Organisation
WMC	Village Water Management Committee
WSAH	Water, Sanitation, and Hygiene services

EXECUTIVE SUMMARY

This study presents a Value Chain Analysis of sesame in Somalia, conducted under the EU-funded VCA4D programme and implemented by Agrinatura, at the request of the EU Delegation and in close collaboration with the Somali government. The sesame value chain in Somalia represents a **strategic agricultural sector with clear economic potential**, yet its overall sustainability is constrained by structural, **social**, and **environmental** challenges. While the sector generates positive returns for all actors involved, its broader contribution to inclusive and resilient development remains limited.

From an economic perspective, the value chain is **consistently profitable across all segments**, with positive margins and returns on investment observed from production to processing and trade. Sesame contributes modestly but meaningfully to the national economy, generating approximately **US$ 39.7 million in total direct and indirect value added** (around 0.3% of GDP) and supporting **export revenues** through a **net positive trade balance**. Trade policies provide a degree of protection to domestic producers, and the sector demonstrates comparative advantage in international markets. However, performance remains highly volatile and climate-dependent, with **production and trade fluctuating significantly** between years. Poor export infrastructure and internal conflict negatively affects international competitiveness.

Despite overall profitability, the value chain is characterized by **strong inequalities in income distribution**. A small proportion of actors (<2%) capture a disproportionate share of profits (50%), while the vast majority, namely primarily smallholder farmers, receive limited returns. Employment is also unevenly distributed, with most jobs (> 90%) concentrated in oil milling activities. At the same time, many value chain actors operate under conditions of **high vulnerability,** driven by climate risks, weak infrastructure, limited access to inputs and knowledge, and a fragile institutional environment. Somalia is considered one of the most vulnerable countries to climate variations. There are no platforms within the sesame VC where these issues are discussed and addressed, or advocacy to capacity building can emerge.

Social sustainability in the sesame value chain remains a **significant concern**, with overall performance rated relatively low across key domains. **Working and living conditions** are **particularly weak**, reflecting limited enforcement of labour standards, low wages, and the children assisting during harvesting and peak agricultural periods. Land and water governance systems are complex and often contested, with customary arrangements under increasing pressure, particularly in riverine areas. These dynamics contribute to **unequal access to resources**, especially for women and youth, and increase insecurity among vulnerable populations.

Structural inequalities further undermine social sustainability. **Gender inequality is pervasive**, with women heavily involved in labour-intensive activities but largely excluded from decision-making, land ownership, and access to resources, finances and services. **Food security is fragile**, as sesame is primarily a cash crop and household welfare is closely tied to **volatile markets and climatic shocks**, while limited crop diversification and poor infrastructure constrain access to nutritious food. Social capital within the value chain is weak, with fragmented farmer organisations, limited collective action, and strong dependence on intermediaries. Combined with poor access to health, education, water, and sanitation services, these factors highlight the **need for sustained investment and more inclusive institutional support** to improve livelihoods and resilience across the value chain.

Sesame production and expansion do not appear to be a major driver of biodiversity loss. The value chain **uses relatively few inputs** compared to many other agricultural systems. Mineral fertiliser application rates are generally low, reducing risks of fertiliser-driven pollution such as acidification or eutrophication. However, **soil fertility management** represents a **concern**. Fertiliser application rates are quite far below agronomic recommendations and nutrient applications are imbalanced, with lime, potassium and other nutrients largely absent. While this reduces the risk of nutrient pollution, it may contribute to long-term soil fertility constraints. In addition, widespread **insecticide use** combined with **unsafe** handling practices creates human health risks.

Water management is the most important environmental challenge. Irrigation systems are often inefficient, and water infrastructure is deteriorated, leading to significant water losses and limited control over floods and droughts. As a result, sesame production remains highly vulnerable to climate shocks. Low and unstable yields further reduce resource-use efficiency, as land, water and energy inputs generate uncertain output. Sesame production is also characterised by **monoculture and very limited varietal diversity**, which reduces resilience to pests and climate variability.

Overall, the main **environmental risks** in the Somali sesame value chain are **not linked to high or excessive intensification**, but rather to weak infrastructure, climate vulnerability, limited adaptive capacity and suboptimal farm management practices. Improving environmental sustainability will therefore depend primarily on **strengthening irrigation and flood-control infrastructure**, promoting improved soil fertility management, expanding varietal research and seed systems, and strengthening farmer training on integrated pest management and safe pesticide use. These interventions would help improve both (environmental) performance and the resilience of sesame production systems in Somalia.

Overall, **while the sesame value chain in Somalia demonstrates** clear economic **potential** and a comparative advantage in international markets, its **long-term sustainability will depend on addressing fundamental structural constraints.** Priority actions include strengthening irrigation and water management infrastructure, improving soil fertility and seed systems, enhancing farmer knowledge and safe input use, and promoting more inclusive and coordinated governance mechanisms across the value chain. Equally important is tackling inequalities in income distribution and improving working and living conditions, particularly for smallholder farmers, women, and vulnerable groups. More broadly, progress in the sesame sector is closely linked to wider efforts in state-building, infrastructure development, and institutional strengthening. A coordinated, multi-level approach that integrates technical, social, economic and institutional interventions will be essential to unlock the full potential of the sesame value chain as a driver of inclusive, resilient, and sustainable development in Somalia.

1. STUDY TIMEFRAME AND METHODOLOGY

In October 2024, the European Union co-hosted the First International Conference on Investment in Agri-Value Chains in Somalia, alongside the Ministry of Agriculture and Irrigation. The event aimed to attract private sector investment into Somalia's agricultural value chains by facilitating business-to-business networking and supporting the launch of new initiatives. The sesame value chain was regarded as a strategic sector due to its strong demand in both domestic and international markets.

The EUD together with the Ministry of Planning, Investment and Economic Development (MPIED) and the Ministry of Agriculture and Irrigation, are asking a specific and comprehensive value chain study on sesame value chain to have an evidence-based reference for promoting targeted initiatives in its support. A key question that emerged was whether this value chain could serve as an effective vehicle for promoting business partnerships and private sector development - and under what conditions. This includes considerations related to enabling public policies, improvements in governance, and the management of potential risks.

The findings of the VCA4D study on sesame could be presented at the Second international Conference on Investment in Agri-Value Chains in Somalia foreseen in October 2026.

The VCA4D study on the sesame value chain in Somalia was scheduled to be implemented between September 2025 and March 2026 (Table 1-1).

A team comprising three international and three Somali experts carried out the study, jointly addressing the functional, economic, social, and environmental analysis. The study planning was undertaken collectively by the entire team. The field work in Somalia was conducted by the three national experts and an appointed local facilitator, under the remote supervision of the international specialists.

This report is the responsibility of the international experts, with active and crucial contributions from, and validation by, the Somali team.

1st Workshop in Nairobi

Following a preliminary desk analysis starting in September 2025, the study included a two-week mission in Nairobi (20–31 October) to train Somali experts on the VCA4D methodology and prepare fieldwork (as in Figure 1.1). The first field mission (2–16 November) was conducted in selected sesame-producing regions of Somalia. The Ministry of Agriculture and Irrigation supported the process and appointed a coordinator.

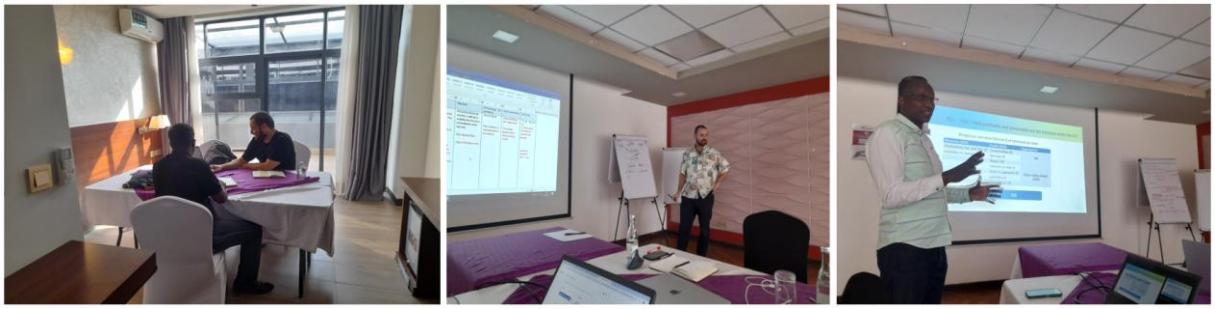

FIGURE 1.1: THE 1ST WORKSHOP IN NAIROBI
Source: Authors

MISSION	DATE	WHERE	PURPOSE	WHO
Inception phase	09/25		Preliminary desk analysis; definition of the work plan and use of budget.	All team
Briefing with PMU and the EUD	15/09/25		Briefing with the VCA4D Project Management Unit (PMU) and the EU.	All team + PMU + EUD
Training/twinning phase	20-31/ 1/ 25	Nairobi	Train the Somali team on VCA4D methodology and its application. Prepare field work mission.	All team
Kick-off meeting	28/11/25	Nairobi	Present study planning	All team + EUD, the MoAI and MP
1st Field mission for data collection	2-16/ 11/ 25	Mogadishu + 3 regions	Field work in Somalia	Somali team
Brief Note for national counterparts, PMU and EUD	End of November 2025		To exchange on the first findings, refine the scope of the study and validate the proposed typology for analysis.	International team + Somali team
2nd Field work	11 – 16/ 01/ 26	Mogadishu region	To finalise data collection	Somali team
2nd Teamwork	19 – 23/ 01 / 26	Nairobi	Data analysis	International + Somali team
Final Study Report	March 2026		INTPA/EUD/PMU and national counterparts	International team + Somali team

TABLE 1-1: STUDY CALENDAR
Source: Authors

1st field mission in Somalia

Following the first Nairobi workshop, the Somali experts started with the first field mission devoted to the data collection from various sesame VC stakeholders. This mission was held from 1 to 15 November 2025. See Annex II and III for a detailed overview of the stakeholders visited per region during this first field mission in Somalia.

During the workshop in Nairobi communications were established with MoAI and other stakeholders through the ministry's technical advisor and the field work facilitator. The team first travelled to Mogadishu, where the experts made their first engagement with MoAI.

Mogadishu was the first location where key stakeholders including millers, large-scale producers, sesame cleaners, exporters, retailers, wholesalers and seed producers were interviewed. Similarly, Jowhar and Baidoa were visited, and most of the planned value-chain actors were met. However, due to bureaucratic challenges, it was not possible to conduct data collection in Afgoye which was scheduled to be the second site after

Mogadishu. In consultation with the Crop Production Department and the Ministry's technical advisor, it was agreed to bring the targeted stakeholders to Mogadishu instead, as in Annex II.

2nd field mission in Somalia

The second field mission took place around Mogadishu between 11 and 16 January 2026 as in Table 1-2. It was meant to cover some of the gaps identified following the compilation of information during the first mission. Some economic statistics still needed to be collected; also, information on microfinance; on sesame exports; on irrigation rehabilitation projects. There were also contacts with millers covering the different milling systems (traditional, small scale, medium scale); industrial size processing (Som Seed Agri). A focus group discussion (FGD) with farmers (small and medium) was conducted to confirm some assumptions. There were also contacts with two women entrepreneurs: a middlewoman and an oil miller. To access sesame attractiveness and preview future trends there was a focus group with youth. Three microfinance enterprises were also interviewed to assess the support given to sesame VC actors.

2nd workshop in Nairobi

During this second team meeting in Nairobi, the Somali experts had the opportunity to share the data collected during the second mission. Each team, economic, social and environment, worked in pairs towards preliminary presentations of their analysis results which were presented to the whole team for discussion. The functional analysis regional typology was revised, and there was an agreement that it wouldn´t make sense to present two sub-chains. There was a participatory effort to elaborate a SWOT analysis of the VC, combining the three analysis outcomes. There was also a remote meeting with Som Seed Agri, which help to clarify some data at the export level. Finally, the team revised the value chain flows and actors, also in a participatory way (as in Figure 1.2).

FIGURE 1.2: 2ND WORKSHOP IN NAIROBI
Source: Authors

Data collection methodology

Economic and environmental quantitative data: The economic and environmental parts of study share data on outputs and inputs in sesame production and processing. Therefore, the team worked together to streamline the data collection especially for farmers and millers, where the data profile to be collected are similar for the two components of the study.

Social data: the collection of (qualitative) social data covered the six domains of the social analysis, by interviewing farmers, village leaders, women farmers, farmer cooperatives and some governmental organisations such as the Ministry of Women and Women's rights, among other. The Social Profile questionnaire was discussed and filled with the support of the Somali social expert, together with the field work facilitator.

Key Informant Interviews (KII): KII were conducted with MoAI representatives at both State and Federal Government levels, oil millers, exporters, specific farmers. The insights resulting from these interviews were wide-ranging and consisted of the environmental and social factors that are in play regarding sesame production in the study areas. Through the KII, the stakeholders pointed out environmental constraints such as droughts, floods, and land degradation, besides the changing weather patterns, which are all negatively impacting productivity, as in Figure 1.3.

FIGURE 1.3: EXAMPLES OF KII
Left: Jowhar, with Farmer. Right: Mogadishu, with MoAI representative
Source: Authors

Focus Group Discussions: Structured FGD were organised with different community groups consisting of smallholder farmers, women's groups, cooperatives, and village leaders, as in Figure 1.4. The FGD collected localised views on the environmental changes that took place in the region such as climate variability, soil fertility, water availability, and the frequency of droughts and floods. Social dimensions were assessed through discussions on gender dynamics, access to resources, intra-household decision-making, working conditions, and community cohesion. Participants also reflected on how climate shocks affect sesame production, household welfare, and community resilience.

FIGURE 1.4: FOCUS GROUP DISCUSSION WITH FARMERS IN JOWHAR
Source: Authors

Field Observation: Site visits were conducted, focusing especially big firms processing plants (i.e., Som Seed Agri) on milling facilities, to observe processing activities first-hand and to gather data directly from stakeholders. Information obtained from focus group discussions, and field observations was cross-verified and compared for the identification of any inconsistencies or gaps.

Remote Interaction between the International and National teams: The Somali team were regularly sharing updates with the international team to ensure the process stayed on the right track and aligned with the approved plan. In the end, the field mission successfully reached most of the targeted stakeholders.

2. FUNCTIONAL ANALYSIS

2.1 Scope of the analysis and major market trends

Sesame has long been a strategic crop in Somalia due to its adaptability to arid conditions, resilience, and strong international demand. Historically, it supported both subsistence farming and cash-income generation, with exports contributing significantly to the agricultural economy in the 1970s and 1980s. Civil conflict in the 1990s disrupted production, marketing, and institutional support, causing declines in cultivated areas and export volumes.

In the 2000s, sesame regained importance as global demand, especially from Middle Eastern and Asian markets, increased. Smallholder farmers adopted it alongside cereals to diversify income. Cultivation area declined from over 110,000 ha in the late 1980s to around 74,000 ha by 2020, while yields remained below global averages (Mumin, 2025).

According to a review developed by the Market Information Department of CoLEAD for VCA4D, sesame is one of Somalia's most important cash crops and a key export commodity. The sector shows strong growth potential, driven by increasing international demand, particularly from Asian and Middle Eastern markets. Major export destinations include China, India, and Turkey, where sesame is mainly used for oil extraction and food processing.

These global market trends also indicate rising demand for natural and organic products, creating opportunities for Somali sesame - especially high-quality white varieties. However, the sector faces several constraints, including limited access to improved seeds, weak post-harvest handling practices, inadequate quality control, and insufficient processing capacity. As a result, most sesame is exported in raw form, with minimal domestic value addition.

For producers, traders, and exporters, the sesame value chain offers opportunities for income diversification and access to expanding global markets.

Price volatility on international markets and reliance on informal trade channels further affect producers' incomes. At the export level, sesame contributes significantly to export earnings. However, trade volumes fluctuate due to limited market access, processing constraints, and dependence on a small number of buyers.

Addressing these challenges through improved quality standards, better aggregation and traceability systems, and increased investment in processing could enhance competitiveness and boost export revenues.

Strengthening coordination among actors and improving compliance with international standards would further support sector development, contributing to economic growth and resilience in Somalia.

In this analysis, national sesame production is estimated at 34,000 metric tons (AgroSomalia, 2024 and IOM, 2026), cultivated over 75,727 hectares (SCALA, 2024). Approximately 80% of production is concentrated in the southern regions of Lower and Middle Shabelle, while the remaining 20% is produced under rain-fed systems in Bay, Bakool, Gedo, and Awdal regions.

According to SCALA (2024), about 25% of national production is exported to global markets, while 75% is sold domestically or regionally as grain or edible oil. Due to limited data on internal market flows, assumptions are made based on sector structure and stakeholder distribution. The sector includes around 300 small and medium oil millers and three main exporters. Based on this, it is estimated that 1% of sesame is processed by SOMSEED, 30% is sold to wholesalers (directly or via brokers), 30% to middlemen, 25% to exporters, and 14% is retained for self-consumption.

In terms of food systems, sesame contributes both directly and indirectly to food security. It is used locally for oil production and livestock feed, while income generated from sesame sales enables households to purchase other food items in local markets.

2.2 Geographic scope of the VCA

Somalia is predominantly a semi-arid country where sesame is cultivated under both rain-fed and irrigated conditions.

The main sesame-growing regions are the Bay region, rain-fed, and riverine regions Lower and Middle Shabelle, and Lower and Middle Juba (as in Figures 2.2 and Table 2-3). The latter benefit from the natural irrigation provided by the Juba and Shabelle river valleys. In these regions, there are four seasons and two cropping cycles. These two cycles allow farmers to harvest twice a year or rotate sesame efficiently with other crops (as in Table 2-2).

The seasons are:

- *Jiilaal* (dry season) – December – March – Very hot and dry; minimal rainfall.
- *Gu* (main rainy season / Long Rains) – April – June – Heaviest and most reliable rains; risk of flooding in lowlands.
- *Hagaa* (dry season / Southwest Monsoon) – July – September – Hot and dry; occasional residual rains.
- *Deyr* (short rains / Second Rainy Season) – October – December – Short and less intense rains; more reliable in South.

The two main cropping cycles correspond to the onset of the *Gu-Hagaa* and the *Deyr* seasons. Land preparation begins in mid-March and ends in mid-April before the onset of the *Gu* rains. This marks the first cropping cycle, which lasts up to August. In the second cropping cycle, the land preparation spans between September and mid-October (before the onset of the *Deyr* rains). As further detailed bellow, additional production also takes place in Bay, Bakool, Gedo and Hiraan regions, which are primarily rain-fed agropastoral areas. In these rain-fed regions, sesame relies on the short *Deyr* rainy season followed by the longer *Jiilaal* dry season for optimal growth.

During the training held in Nairobi, in collaboration with the EU Delegation in Somalia, three regions were selected, representing both riverine and rain-fed areas, along with three towns – Afgoye, Jowhar, and Baidoa, as in Table 2--1 and Figure 2.1 and Figure 2.2. An itinerary for the two weeks of field work was also developed, aligned with a list of key actors to be contacted in each region. The economic, social, and environmental experts identified a list of actors that should be prioritised for contact during the field mission (as in Annex I and II).

In identifying these regions, consideration was given to the security conditions required for the field work implementation, as well as to the two edaphic-climatic conditions that define different farming systems, actors, scale, and practices – regions where producers depend on rainfall; regions with favourable natural irrigation conditions, or benefiting from irrigation systems. (Table 2-1).

FIGURE 2.1: MAP OF SOMALIA
Source: United Nations (2011), Department of Field Support, Cartographic Section

STATE	REGION	TOWNS	CONDITIONS
South-west state	Bay	Baidoa, Baydoa, Baydaho or Baydhabo	Located inland. Its semi-arid climate, combined with areas of fertile soil, supports rain-fed sesame cultivation.
South-west state	Lower Shabelle	Mogadishu – capital	Somalia's main port and economic, cultural, and administrative centre
South-west state		Afgoye	This region is known for its good irrigation systems.
Hirshabelle state	Middle Shabelle	Jowhar or Jawhar	Located along the Shabelle River, this region also benefits from similar agricultural advantages as Afgoye.

TABLE 2-1: THE THREE REGIONS IDENTIFIED
Source: Authors

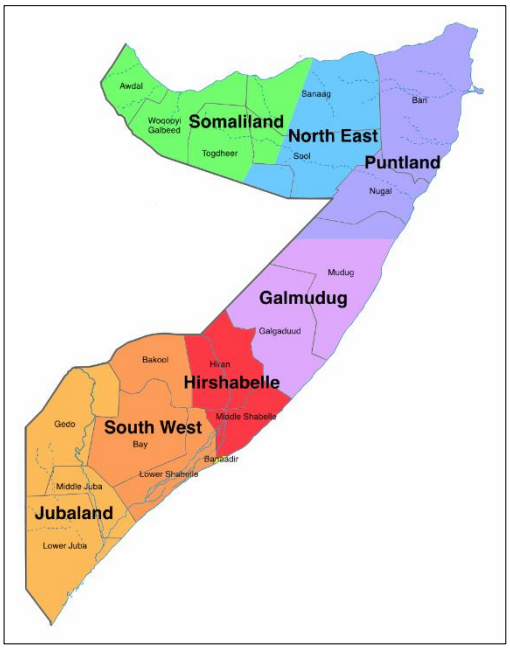

FIGURE 2.2: STATES AND REGIONS OF SOMALIA
Source: Zabezt (2024), Wikimedia Commons

In the Bay region, it was anticipated by the team, during the preparatory workshop in Nairobi, that small-, medium-, and large-scale farmers would predominantly rely on traditional farming practices, with limited access to advanced inputs such as improved seeds and modern production techniques and technologies. It was also thought that despite their semi-arid conditions, these regions would possess abundant land resources, allowing for the cultivation of larger production areas. This assumption was contradicted when the national experts visited the region and realised that the lack of technical tools prevented the expansion of land for sesame production.

In irrigated regions (Lower and Middle Shabelle), it was anticipated that a diverse mix of farmers would have better access to inputs, such as improved seeds or mechanic equipment's, reflecting the regions' fertile riverine and irrigated agricultural systems. Riverine farmers have adapted to using irrigation during the dry season; however, only about one quarter of agriculture production relies on irrigation, while the remaining three quarters depends on rain-fed farming. In the irrigated regions, significant investments have been made by federal state (MoAI) with support from the European Union, and in collaboration with international organisations such as the Food and Agriculture Organisation of the United Nations (FAO), in rehabilitating major primary and secondary irrigation infrastructure.

Apart from these criteria based on edaphic-climatic conditions, reflected on production level (in terms of small-scale, medium-scale, and large-scale farmers) the team took also into account the production systems (rain-fed versus irrigated systems).

It is nevertheless important to note that there might be rain-fed sesame production in irrigated regions. In Afgoye, around 20% of sesame plantations are rain-fed (FAO and FSNAU, 2013). When water is scarce or river levels drop, rain-fed farming becomes more important – but also more vulnerable. While rain-fed areas account for approximately 20% of the Afgoye region, they contribute a disproportionately smaller share of medium and large farms, which are concentrated in irrigated riverine zones due to water access, land security, and commercial viability.

2.3 Value chain actors

As in all value chains, there are different actors in the sesame value chain from the input providers, producers to the consumers. There are seeds suppliers, farm supply stores, middlemen and middlewomen, wholesalers/brokers, oil millers, retailers, local consumers, and exporters / industrial processors.

Sesame has been one of the cash crops, for income and food security of the farmers' households, produced for long years in Somalia. It is a drought-resistant crop capable of surviving under adverse conditions, including poor soils, dry weather and high temperatures, due to its deep roots. These traits contribute to the high value of this cash crop for the Somali people, still having a good demand.

Sesame production in Somalia is generally characterised by low productivity due to smallholder agriculture and an underdeveloped production system. Farmers tend to rely on extensive production systems rather than intensive farming, which results in lower output regardless of farm size (Abdullahi, 2023).

For the description of the various stages of sesame production and marketing, although the term sesame *seed* is commonly used in the literature to refer to the final product (the raw material), we have chosen to use *grains* for the harvested product and *seeds* for the seeds used in planting.

Somalia primarily produces sesame grains both for domestic consumption and international markets, yet the internal market plays a more important role. There are white, brown, and black sesame varieties, with the white variety considered the most suitable for export.

Sesame oil is mainly consumed locally. Across the sesame-producing regions, there are various oil mills that differ in the technologies they use, ranging from traditional to modern technologies. The most rudimentary types of sesame mills are powered by animal force (camel powered); however, these mills are practically no longer active, even though they are valued for the taste of the oil produced. There are other homemade products such as drinks, sesame sweets for household consumption or sold by women and children in the nearest bazaars. Sesame cakes, a by-product left after oil extraction may be used to feed the livestock.

Exported in grains (i.e., preferably white grains), sesame is mainly used for oil production. Internationally it may be converted into a variety of by-products that range from cosmetics to cooking, pharmaceuticals, and other industrial applications such as *tahini* – used as a base for sauces and preparations such as halva and various confectionery products; roasted and coated seeds are – used in baking and as snacks; and the defatted flour – obtained after oil extraction – which can enhance the protein content of cereal-based formulations.

2.3.1 Typology of sesame producers

To create the typology of sesame producers we grouped farmers into meaningful categories based on shared characteristics such as farm size and land use, labour characteristics, production system (rain-fed vs, irrigated) inputs and technologies used, and market orientation, as in Table 2-2.

FARMERS' TYPES	System	Regions	Inputs	Markets	Processing/ by products	Labour	Land ownership	Land size
T1 **SMALL –** **Family farmers**	Rain-fed	Bay region, Bakool, Gedo, Hiraan Afgoye and Jowhar regions Sorghum and maize	Traditional/ local varieties, seeds saved by the farmers for the next season (1 year) Some may buy from a seed company/	Primarily domestic market / selling to middlemen/brokers immediately after harvest. Storing facilities Use of donkey carts	Animal feed The majority is sold (mostly to oil millers) Oil refined using old machines	Family labour Hired seasonal labour	Land inherited, not registered Previously government land is being used	~1 ha - 2,5 ha (?) It varies (land size doesn't classify this group) Hours as measure 4h = 1 ha

FARMERS' TYPES	System	Regions	Inputs	Markets	Processing/ by products	Labour	Land ownership	Land size
			NGO or no mechanization. Use hand tools + tractors (hired) Land use = land available, possible expansion No mechanical threshers					
T2 **COMMERCIAL MEDIUM/ LARGE** Commercial farmers , commercial farmers 3 types of farmers (small, medium, large)	Jowhar, Middle-Shabelle region Irrigated	Located in riverine zones: along the Shabelle river + Canals rehabilitated and extended by FAO	All (S+M+L) Riverine irrigated Pumps Tractors Small: Local seeds No pesticides? No fertilizers Medium: Local seeds Pesticides No fertilizers Large: Improved seeds Pesticides Fertilizers Extremely Large >50 – 700 ha	All (S,M,L) Potential for Ag credit from banks Small: Medium: Large: May buy sesame from small farmers Some have direct links to exporters Commercial farmers = production done properly	Animal feed Oil refined using improved machines	Small: like in Bay Medium: Hired Large: Hired Skilled labour	Weight of traditional authorities: Only involved in conflict resolution	5ha – 8ha Small = 1-2 ha Medium = 2-5ha Large = 5-15ha Smaller land or same or larger size than in Bay
T3 **LARGE – Export oriented**	Afgoye, Lower Shabelle	Riverine irrigation +Rehabilitated canals by FAO Banana + other horticultural crops = very important here (more than in Jowhar)	Trial plots for improved varieties (not operational anymore? □ visit CSET plots) Small: Similar to Jowhar Medium: Similar to Jowhar Large: Not present	Similar to Jowhar	Similar to Jowhar	Similar to Jowhar	Similar to Jowhar	Similar to Jowhar

TABLE 2-2: TYPOLOGY OF SESAME PRODUCERS
Source: Authors

T1 – Small Family Farmers

Family farmers are found in both rain-fed and irrigated areas (Baidoa, Afgoye, Jowhar), they constitute most Somalia sesame farmers. They are vulnerable, despite being market oriented. They are defined more by their productive practices and domestic market orientation than by the size of their land.

The land is usually inherited or rented and not registered. Traditional authorities have a role to play to define land ownership and manage land conflicts. Family labour is predominant, although some farmers hire seasonal workers. Seeds are usually saved from the previous season or obtained from cooperatives or humanitarian organizations (NGO). Most farming practices are rudimentary, with little to no mechanization. Farmers primarily sell their produce to wholesalers immediately after harvesting, which is when the supply is abundant so that consequently the prices are relatively low and are fully dependent on middlemen/ mi traders (*dalaal*). They lack market information (Abdullahi, 2023). They also sell sesame grains in small quantities to oil millers, retailers, local consumers, and exporters.

In the Bay region, land is generally available, and expansion is possible due to a poorly defined land tenure system. Yet, during the first mission it became evident to the team that significant barriers hamper land expansion. Most of productive practices are very rudimentary and largely manual, so contrary to the expectations, there are human limitations to the expansion of cultivated land.

T2 – Commercial medium / Large Farmers

Commercial farmers benefit from effective irrigation systems. They are located mainly in riverine zones (Middle and Lower Shabelle plus the Middle Juba region along the Juba River). Their farms may be small in size, but they are market oriented. They make use of irrigation structures such as canals and pumps, jointly implemented by FAO and the EU. They are entitled to get credit (microfinance) from banks. Medium farmers hire local labour. Larger farmers hire skilled labour. Some may have direct links with brokers/ exporters. Production operations are done properly. Mechanization. Improved varieties (trial plots). Commercial farmers have a higher negotiation power.

T3 – Large Farmers/ Export-oriented Operators

Export-oriented operators are found mainly in Mogadishu town or its surrounding areas. They have better infrastructure (mechanical cleaning/ de-hulling, storage, export logistics) and rely on small and medium farmers to procure additional raw material.

Sesame farming in Somalia is predominantly manual, involving activities such as planting, weeding, harvesting, and post-harvest processing. Post-harvesting processing is rudimentary and consists mainly of traditional (handmade) threshing techniques and simple cleaning procedures.

Production practices

Land preparation

Land preparation is done in the dry season. Furrowing, a very important technique to ensure smooth flow of water in the field, is mainly applied by middle and large farmers. This can be done manually or using tractors. Tractors are usually hired and shared among the farmers (rented = 10 USD/ 1h from private companies or farmers). Farmers' associations/ cooperatives play a crucial role in facilitating mechanized agriculture, particularly through the provision and management of tractors, in both regions. Under optimal farming conditions, a fine tilt is prepared to ensure good germination. Land preparation for planting may also involve ploughing by a disk plow then harrowing with a disk harrow (CEFA, USAID and GEEL, 2016).

Sowing

Across the study sample roughly **60%** of sesame farmers **sow sesame in lines**, while the remaining 40% practice broadcasting (Figure 2.3). Clear regional differences can be seen with most farmers (>85%) in Bay sowing in lines, while only one-third sow in lines in Jowhar. This can be explained by the fact that the average area under sesame cultivation per farmer in Jowhar is much larger than in Bay, with Afgoye being in the middle. Area under sesame cultivation is inversely correlated with the proportion of farmers sowing in lines, as sowing is done manually. Sowing in lines easily requires double or triple the amount of time as broadcasting. Thus, in case of large farms, especially in Jowhar, sowing in lines would be constraining in terms of labour availability and the short window of opportunity to correctly time the planting of sesame.

Optimal planting distances depend on many factors, including the variety used, however in general within row distances of about 10cm and between row distances of 30 – 40cm are recommended (FA0, 2023). Farmer interviews conducted found within row distances of 20 – 40cm, with a median of 35 cm, and between row distances of 40 – 75 cm, with a median of 50cm. Thus, farmers in Somalia appear to have **very low planting densities** compared to general recommendations.

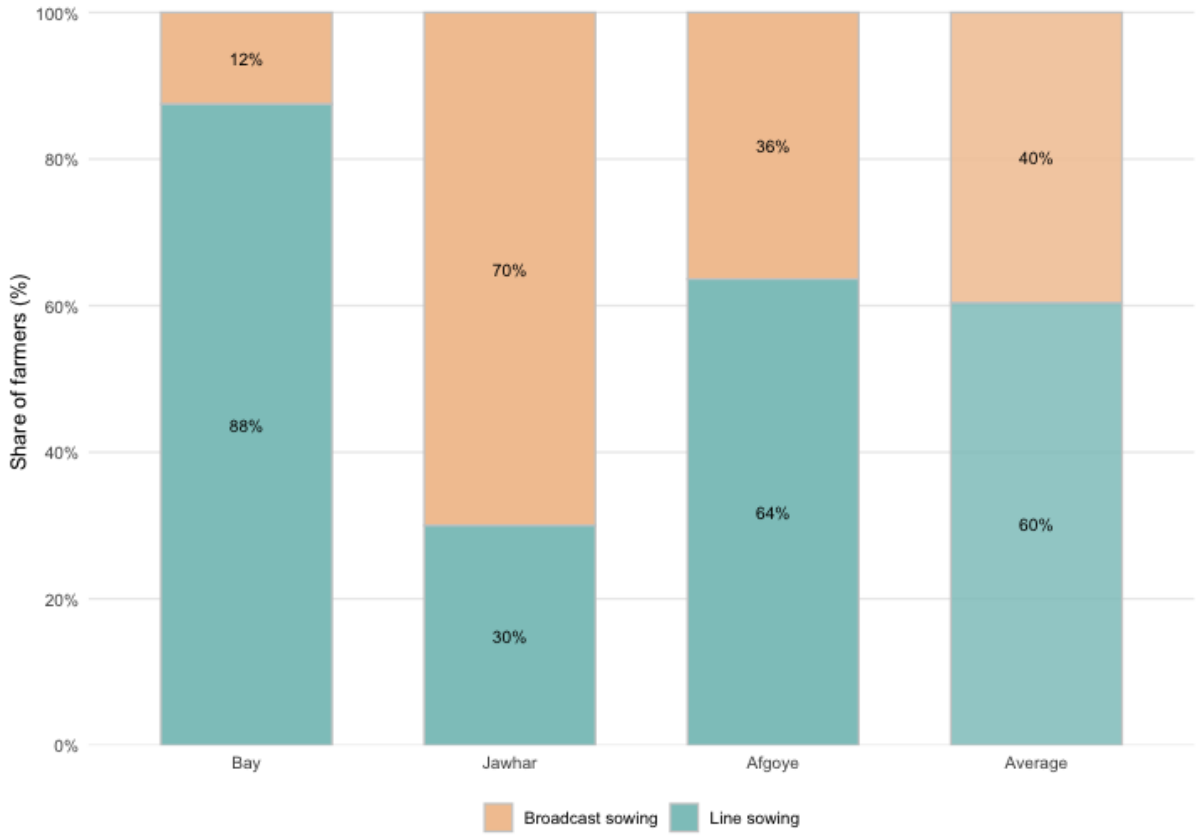

FIGURE 2.3: PROPORTION OF FARMERS SOWING SESAME IN LINES VERSUS BROADCASTING PER REGION (N=30)

Weeding

The first weeding should be done three to four weeks after planting. In this process, all plants that bring about competition to the sesame crop should be removed. This is done manually using hand-hoes where the weeds are carefully uprooted to avoid injuring the plant roots. (CEFA, USAID and GEEL, 2016).

Harvesting

Sesame is harvested between 75 to 105 days after planting. Proper inspection should be done to check for

maturity signs to prevent premature harvesting which might cause low quality produce. After the plant reaches harvest maturity, it is manually uprooted. Sesame farmers use specific way of harvesting-*siibis*. *Siibis* means to remove the plant with its roots. The farmers believe that oil content and quality of the grain increases when the roots of the plants are left intact between harvest and threshing. One disadvantage of this process is that it increases soil contamination of the grains. When the lowest pods are ripe and about to open, the harvesters uproot the plants, tie the branches in small stooks – bundle or small stack of sheaves of grain stood upright to dry after harvesting – in one area of the field. Child labour is used for harvesting.

Threshing

Threshing (or crushing) is a very important operation. It is carried out to remove the seeds from their pods. The threshing site and the canvas used to collect the seeds are specially valued, to avoid contamination with soil, gravel stone or other inert materials.

Cleaning

Winnowing is later done to remove unwanted material from the seeds by wind. A Manual issued by the Comitato Europeo per la Formazione e l'Agricoltura/USAID, in 2016, gives a special importance to the cleaning operations, to ensure that the grains are not lost and that their quality is maintained. Even so, one of the exporters interviewed by the team complained about this frequent contamination.

Irrigation

Despite being a drought resistant crop, irrigation is critically important for sesame cultivation, since rainfall is low, erratic and unreliable, even in the riverine areas. Without irrigation, sesame production in Somalia would be highly unstable and largely subsistence based.

There are several types of irrigation: water reservoirs, shallow wells, surface irrigation, gravity irrigation, spate irrigation, using canals and pumps, as in Table 2-3 and Figure 2.4 (irrigation canal). Farmers from Jowhar expressed the need for training on soil bunds and water-use efficiency (Jowhar, FG with farmers). They recognized an increase in irrigated sesame production, attributing it to the development of canal systems and private investment, even though these are government managed. These irrigation systems support the cultivation of sesame, banana, and maize. Irrigation constraints have also a direct effect on sesame oil millers, because sesame millers depend on a steady, reliable supply of quality sesame seeds.

FIGURE 2.4: JOWHAR, IRRIGATION CANALS
Source: Authors

Areas of sesame cultivation	Regions	Irrigation techniques	Description
Rain-fed areas	Bay (Baidoa), also may be found in Middle and Lower Shabelle (Afgoye)	Berkards	Rainwater reservoirs
		Shallow wells	Also defined as *non-formal irrigation.* There is no formal irrigation; there are shallow wells only. They retain water in terracing, soil bunds.
		Surface irrigation – (furrows / canals)	The traditional method for small-holder sesame farmers – According to a production-manual for sesame in Somalia, fields are prepared with ridges and furrows before planting to allow smooth water flow (CEFA, USAID and GEEL, 2016)
Riverine areas	Near Shabelle and Juba rivers	*Gravity irrigation*	Water from natural flooding plays a crucial irrigation role (85%). This method uses the natural rise and falls of river water rather than engineered channels.
		Spate irrigation	A traditional, flood-based irrigation system used mainly in arid and semi-arid regions where rainfall is low, irregular, and comes in short, intense storms. Instead of relying on a constant river flow, spate irrigation captures sudden floodwater (spates) from seasonal rivers or dry riverbeds (*wadis*) and spreads it over agricultural land.
		Canals and pumps	In areas near rivers canals are built to divert the water to the agriculture fields (15%).
	Away from the rivers		Secondary canals make it possible to reach more households away from the riverside. In some fields, especially upland plots away from river embankments, water is fetched using hand pumps, small diesel or electric pumps, or buckets – essentially supplementary irrigation.

TABLE 2-3: TYPES OF IRRIGATION
Source: Authors

2.3.2 Typology of Traders and Exporters

Small-Scale Traders (Local Middlemen)

Middlemen/ middlewomen or '*Dalaal*' – They are small village traders or collectors (grain aggregators). In these regions many are in reality middlewomen. They collect the sesame grains in small quantities directly from producers and resell to *brokers/wholesalers*, *oil millers*, and *exporters* in a more marketable quantity (than the producer's marketable quantity). *Middlmen* also sell sesame bags in urban centers. They also provide sesame grains to the different scales of oil millers. Few farmers sell to oil millers, mainly due to distance constraints.

Some exporters prefer to buy the grains directly from the farmers to avoid the middlemen. They use their own farmers' network. *If we work with middlemen the farmers will not be paid. The easiest way, we collect from one person and they distributed among them* (Nairobi, KII with exporter during the first workshop).

- Operate at village or district level.
- Buy sesame in small quantities directly from farmers.
- Supply to larger traders or local markets.
- Often rely on cash transactions and informal credit.

Inter-District Regional Traders or Retailers

Retailers sell the grains generally in local markets, as in Figure 2.5. The consumers are households, shops or small-scale processors, who buy small quantities.

There are different types of retailers:

- Local Market Traders – Small-scale vendors selling sesame seeds or oil in village markets or neighbourhood stalls.
- Wholesale Traders – Operate at district or regional levels, supplying bulk sesame to smaller retailers, processors, or exporters.
- Processing-linked Retailers – Shops or cooperatives selling value-added sesame products, such as sesame oil, tahini, or roasted seeds.
- Urban Retailers and Supermarkets – Limited but growing presence in cities, offering packaged sesame seeds or oil for urban consumers.

Retailers of sesame grain do not sell sesame oil; retailers of sesame oil and retailers of sesame grain are two different actors of the value chain. Traditional sesame oil from camel oil millers as well as *maankaal*,[1] by-product of sesame oil, are not subject to retail marketing trade. Final consumers buy the traditional sesame oil directly from the camel oil miller; likewise, livestock farmers buy directly *maankaal* from the oil millers. Camel oi millers do not sell *maankaal*; it is used internally to feed camels providing animal energy required in the oil extraction.

[1] *Mannkaal* refers to the sesame oil cake, a by-product left after sesame seeds are pressed to extract oil. It is commonly used as supplementary livestock feed.

FIGURE 2.5: SESAME GRAINS BEING SOLD IN THE LOCAL MARKET IN BAIDOA, DURING THE FIRST MISSION
Source: Authors

- Purchase sesame from multiple villages or districts.
- Transport and aggregate produce to regional hubs (e.g., Mogadishu, Jowhar, Baidoa).
- Sometimes provide credit or inputs to farmers in exchange for produce.

Brokers and Wholesalers

The middlemen in general sell to another larger agent (the *broker*). The broker is looking for the best grains. In some cases, the farmers bring their harvest directly to the broker. When the broker finds a market, he contacts the farmers to inform them of the current price, and the farmers then decide whether to sell or not.

Wholesalers are larger suppliers who have better capacities in terms of finance and other facilities than the others. They resell the sesame seeds to retailers, oil millers, and exporters.

- Purchase in bulk from regional traders.
- Handle storage and sorting, often cleaning sesame before sale.
- Supply local processors, oil mills, or exporters.
- May operate with semi-formal contracts and occasional market intelligence.

Exporters

Somalia's sesame export sector consists of diverse actors ranging from smallholder-linked intermediaries to formal exporting firms, as in Table 2-4. Most exports originate from fragmented supply chains where farmers depend on brokers and traders to access markets. A smaller segment includes structured companies that aggregate, clean, certify, and export sesame to destinations such as the Middle East and Asia. Limited processing capacity means value-added exports remain underdeveloped. Informal cross-border trade also plays a role. Despite strong global demand and its importance as a key export crop, the sector faces constraints including weak infrastructure, low productivity, poor quality control, and limited access to finance and market information.

- Engage in international trade, primarily to Middle East, Asia, and Europe.
- Handle quality control, packaging, and logistics for overseas buyers.

- Some operate vertically integrated operations, including trading and processing.
- Often registered businesses that must comply with export regulations.

Types of exporters	How the sesame is obtained	Main challenge
Smallholder linked	Farmers sell to collectors and brokers who aggregate volumes for export	Limited bargaining power
Trader-exporter	Local traders and brokers consolidate sesame and handle logistics and export transactions	Often dominate price setting and market access.
Company-based	Registered firms (e.g., Som Seeds) source, clean, certify, and export sesame to international markets.	Limited competition, limited regulation
Processor-exporter	Firms that clean, hull, or process sesame before export (still limited in Somalia).	Limited competition, limited regulation
Farmland owner-exporter	Some export companies such as AlMizan, ADCO, AlShraf international own important farmlands (200-600 ha) while collaborating with smallholder farmers	Poor-quality seeds
Informal/cross-border exporters	Small-scale actors trading sesame through informal regional routes with minimal regulation.	Limited competition, limited regulation

TABLE 2-4: TYPOLOGY OF SESAME EXPORTERS
Source: Authors

A good example is Som Seed Agri, who started in 2006 using complex machinery that enabled this exporter to sell to EU, China, Vietnam and the Middle East. After 2019, they started investing preferably in the European market. Today they are expanding to the Middle East. They have a branch in Dubai, where they do grains' quality control. According to this exporter it would be easier to have the tests in Somalia, but we don't have these facilities. Storage and Transportations are the major challenges identified by this exporter.

Some like Som Seed Agri (Figure 2.6) have more sophisticate machinery to fulfil the international (EU) standards.

Some exporters interviewed, complain about the bad quality of produce that could be solved with better storage facilities at the farmers' level.

FIGURE 2.6: SOM SEED AGRI, MOGADISHU, DURING THE 2ND MISSION
Source: Authors

2.3.3 Typology of sesame processors – oil millers

T1 Traditional-Camel Miller

The traditional milling system uses animal-powered pressing. Sesame seeds (typically locally grown black and white varieties) are placed under grindstones arranged in a circle. In some traditional mills, a camel walks in circles to turn the stones, crushing the seeds and releasing their oil. This method is slower than modern mechanical presses but is valued for producing high-quality, flavorful oil.

There are still traditional mills (T1 in Table 2-5) that use animal power (camel) and basic tools such as grindstones (Figure 2.7). These traditional mills produce mainly for local markets. The oil produced is, nevertheless, valued for its unique taste. The price may even be higher, than the one mechanically produced, and it may reach export markets (consumed mainly by Somalia diaspora).

A camel miller was interviewed during the second mission, near Mogadishu (Dharkenley village). He is aware that he is producing especial oil. He sells to what he defines as *knowledgeable people*. People who value this type of oil know what they are buying. He has his own clients. Not for commercial purposes. The price is high USD $ 6.

Camel millers are generally open to limited, low-cost technical improvements that respect traditional practices and do not replace camels or introduce fuel dependency.

According to the traditional miller interviewed, acceptable innovations to the machinery he uses, include:

- Improved pressing stones or wooden structures to increase oil yield
- Simple manual improvements that reduce physical strain

He emphasized: *We accept improvements, but the mill must remain traditional and affordable.*

The miller also stressed that camel-powered mills are environmentally friendly, as they rely on renewable energy and do not use fuel.

Camel mills protect the environment and our culture, but they need support to survive.

Few farmers sell sesame to oil millers due to (transportation) price constraints and long distances, with most oil production being informal and small-scale. This pattern is similar to both Afgoye, Jowhar and Baidoa. (FGD in the three regions, first mission). The millers buy from intermediaries – middlemen – and wholesalers.

FIGURE 2.7: CAMEL MILL AND MILL GRINDER IN KAARAN, BANADIR
Source: Authors

T2 *Modern* Semi-Technological Miller

Most oil millers use modern mechanical presses powered by a motor. These so-called *modern* millers operate in towns, near the sesame producing areas. The vast majority uses rudimentary machinery (T2).

These semi-technological millers use a metal screw or expeller press powered by a motor. It enables continuous operation. They are the most common *modern* option in towns.

In Mogadishu area there are more than 300 oil millers (USAID, 1984; FAO and UNDP, 2024). They are mostly microprocessors / small family-owned mills, not industrial plants. There is a clear interest by farmers' organizations to having the possibility of processing sesame. A cooperative in Afgoye has mentioned the need for training in oil milling.

If we can press sesame oil ourselves, we can sell it in town and earn more than just selling seeds. The oil brings money all year, not just at harvest. (Afgoye, KII with village leader).

Low mechanization leads to lower oil extraction efficiency (~48%) compared to potential yields (~50–55%) with improved technology.

T3 High-Technological Miller

There are also high-technology millers mainly inserted in exporter industrial plants. Private firms such as Som Seed Agri run state-of-the-art hulled-sesame and oil facilities they use with the grains that are left after the final sorting process; other commercial traders (e.g., Liin Hassan, Al-Mizan/others) operate or are investing in processing plants and oil-pressing lines in/around Mogadishu. These firms have invested in modern cleaning, de-hulling and oil-pressing equipment and (in some cases) food-safety certification.

The high-technology mill uses a motorized mechanical press. Includes seed cleaning, roasting, pressing, and basic filtration. Batch or semi-continuous production. Oil may be sold unrefined or lightly refined.

The retail price range for Somalia sesame oil is between US$ 1.43 and US$ 4.30 per kilogram or between US$ 0.65 and US$ 1.95 per pound (Wamucii, n.d.).

MILL TYPES	Where to be found	System	Grains' origin	Consumers	Market	End-products
T1 **TRADITIONAL CAMEL – MILL**	May be found in local agricultural or rural areas where sesame is grown. Mogadishu	Manual/animal-powered pressing. The pressing uses basic tools like wooden funnels and stone grinders	Locally grown black and white varieties	Consumers prize this unrefined oil for its taste and purity. Strong cultural value. Local families Artisanal markets	Sold (by middlemen) in Somali markets, grocery stores, and food shops throughout the country. Niche export markets?	The end product is unrefined sesame oil – called *macsaro* Considered *authentic* Somali flavour The leftover seed husks (called *kashkash*) are commonly used as animal feed.
T2 **SEMI-TECHNOLOGY**	Small cooperatives Rural micro-enterprises	Metal screw press where seeds are compressed mechanically.	Locally grown black and white varieties	Urban households Small-scale restaurants Micro-businesses selling bulk sesame oil	Small cooperatives Local markets	Clean oil, mostly sediment-free; unrefined or lightly filtered.
T3 **HIGH–TECHNOLOGY – Motorized Mechanical Press**	Most common *modern* option in towns	Motorized Mechanical Press Electric motor or diesel engine	Larger farm outputs, may include regional suppliers	Restaurants and hotels Export buyers requiring consistency Health-conscious urban consumers	Supermarkets	Clean oil, mostly sediment-free; unrefined or lightly filtered.

TABLE 2-5: TYPOLOGY OF SESAME OIL MILLERS
Source: Authors

2.4 Sesame yield

2.4.1 Relative performance – Comparing sesame yields

According to our data, the median sesame yield varies **between 250 and 400 kg/ha/season across regions,** seasons and years. According to FAOSTAT (2024), the estimated average sesame yield in Somalia is 441 kg/ha, which is slightly higher than the range of median yield values (250 – 400 kg/ha) obtained during our study. When comparing the median sesame yield for Somalia obtained from farmer interviews with global and regional yield data, we can observe the following:

Average sesame yield is found to be highest in China (1520 kg/ha), followed by Laos (1424 kg/ha), Nigeria (1286 kg/ha) and Cameroon (1250 kg/ha) (FAO, 2024). However, care should be taken when interpreting these national level statistics as yields (kg/ha) are simply calculated by taking 'total production (kg)' and dividing it by

'harvested area (ha)'. For example, it is highly likely that the sesame yields (kg/ha) for Nigeria and Cameroon are inflated due to informal streams of sesame entering these countries from for example Chad and Niger, which leads to an 'increase' in 'total production (kg)'. Production from landlocked countries often ends up in the statistics of more stable neighbouring countries with ports for export. Additionally, 'harvested area (ha)' used by FAO means excluding crop failures which can have a significant influence on average yield (kg/ha) for certain countries like Somalia where total yield loss can be common and widespread due to floods and droughts.

While the FAOSTAT data is clearly imperfect, it can provide some insight into the relative position of sesame yields in Somalia compared to other countries. The FAO data contains 29 **African** countries with non-zero non-outlier data on sesame yields. According to FAO (2024), the average sesame yield across Africa is 600 kg/ha, with a median of 509 kg/ha. **Somalia** can be found on place 21 out of the 29 in terms of yield, or the bottom **28th percentile**, meaning 72% of African countries have a higher average sesame yield than Somalia (FAO, 2024). According to FAO (2024), the lowest average sesame yield can be found in Guinea-Bissau with a value of 254 kg/ha. This falls in the same range as the lower range of our yield estimation for Somalia (250 – 400 kg/ha).

2.4.2 Drivers behind the large yield variability – Interannual and seasonal effects outweigh regional differences

The median sesame yield in Somalia varies between 250 and 400 kg/ha/season across regions, seasons and years. Nonetheless, it is not uncommon for farmers to experience a total yield loss in certain seasons and years. Due to the limited sample size, statistical comparisons of sesame yield between regions or other comparisons are not possible. Thus, we can only say that it seems that yields in Jowhar appear to be somewhat lower than in Bay and Afgoye. Based on our sample, it does not seem that one season always leads to significantly higher yields than another season, given the same location.

Data analysis indicates that **yield variability is primarily driven by interannual climatic conditions, with seasonal effects (*Gu* vs *Deyr*)** interacting with these year-specific climate dynamics, while regional differences appear comparatively limited. Interannual fluctuations are substantial: for example, median yields in Bay ranged from 0 kg/ha (*Deyr* 2023) to approximately 350 kg/ha (Gu 2025). In contrast, pooled seasonal differences within regions are more moderate and less consistent than year-to-year variation. Regional differences within a given season generally remain within roughly 50–120 kg/ha, with overlapping distributions across regions.

These magnitudes suggest that temporal factors – particularly year-specific rainfall variability and climate shocks – exert a stronger influence on yield outcomes than structural spatial differences between Bay, Jowhar and Afgoye. From a climate risk perspective, exposure to interannual rainfall variability therefore appears to be a more significant determinant of productivity than location per se. Regions differ mainly in the types of risks to which they are exposed rather than in consistently higher or lower productivity levels. Nonetheless, Bay appears particularly vulnerable to extreme droughts and floods during *Deyr* seasons, as illustrated by the zero median yield recorded in 2023, as in Table 2.6. For mean and median sesame yields per season per year for 2023 – 2025, see annex X.

SEASON	REGION	n	MEAN (kg/ha)	MEDIAN (kg/ha)	STD. DEV. (kg/ha)
Deyr	Bay	6	320	400	209
Deyr	Jowhar	15	342	291	226
Deyr	Afgoye	16	369	388	120
Gu	Bay	12	312	331	178
Gu	Jowhar	14	296	251	193
Gu	Afgoye	8	389	414	93

TABLE 2-6: SESAME YIELD (KG/HA) ACROSS REGIONS AND SEASONS

Source: Authors

2.4.3 Potential irrigation yield effects are confounded by regional characteristics

The **irrigation method is strongly correlated with region**, with rainfed systems being concentrated in Bay and mainly motorised irrigation systems in Afgoye. Given the small sample size in combination with structural confounding, this implies that we should be **careful when it comes to statements regarding the effect of irrigation methods on yield.**

Across *Gu* and *Deyr* seasons between 2023 and 2025, neither non-motorised nor motorised irrigation shows a consistent positive effect on sesame yield per hectare, likely also linked to the limited sample size. Nonetheless, there are indications that non-motorised irrigation and motorised irrigation can have positive effects on sesame yield during the *Deyr* season, with motorised irrigation potentially resulting in higher yields than non-motorised systems.

2.4.4 No evidence of scale effects on yield

Across *Gu* 2024, *Gu* 2025, *Deyr* 2024 and *Deyr* 2023, **sesame area shows no meaningful association with yield per hectare**. Linear and log(–log) models consistently yield small, statistically non-significant effect sizes, explaining less than 1–3% of yield variation in most cases. These results indicate that **yield differences are not driven by scale of sesame cultivation**, but by other biophysical and management factors, such as the interannual and seasonal yield effects mentioned above.

2.4.5 Data limitations affect yield assessment

These findings should be **interpreted with caution given the relatively small sample sizes** per region and season, which limit statistical power and generalisability. They should primarily be used to gain insights into orders of magnitude in terms yield and the drivers behind yield differences. Strengthening the collection of consistent, season-specific yield data across regions would be essential for more robust analysis. Improved yield data would not only allow clearer identification of productivity drivers but would also enhance understanding of constraints within the sesame value chain, thereby supporting more targeted interventions aimed at stabilising production under increasing climate variability.

2.5 Input dealers and support services

2.5.1 Input dealers

The market system for inputs is poorly developed involving private agro-shops, district and rural retailers, village vendors. They are also sold by a handful of importers who have wholesaling/distribution points in Mogadishu.

These suppliers of quality inputs are far from the most needed farmers. Especially small family farmers that account for most farmers in Somalia, lack the necessary technical and material input to improve their production and productivity (Abdullahi, 2023). In addition to the distance of the suppliers of quality products, the poorer smallholders are unable to afford these inputs as their incomes are limited, and access to credit and financial services are limited. Additionally, with limited extension, farmers lacked knowledge on the use of chemical products such as pesticides and fertiliser are low. The result is an ineffective use of these inputs (USAID, 2020).

Some companies are, nevertheless, involved in supplying sesame seed inputs, and in some cases other inputs like fertiliser, agro-chemicals, machinery, or seed varieties. These companies are typically involved in purchasing sesame from small and medium size commercial farmers for export markets.

Inputs for sesame oil millers

Small scale sesame oil millers are also dependent on fuel and technology providers.
Sesame seeds cleaning equipment, small mechanical expellers, filters, and pumps are brought by local importers from countries like Taiwan, Japan, or India. In the first mission an Indian machine owner.

Traditional camel-powered mills rely entirely on locally available and non-fuel inputs. The main inputs include camels, wooden or stone presses, grinding stones, ropes, containers, and labour, all of which are sourced within the community or nearby markets. Camels are either owned by the mill operator or borrowed through kinship arrangements, reflecting the strong social capital and traditional cooperation mechanisms prevalent in the region.

Everything we use comes from the community; we depend on experience passed from our fathers.

There is no formal technical support provided to camel millers. Knowledge related to mill operation, camel handling, and oil extraction is transferred through traditional practices and intergenerational learning. Occasional advice may be received informally from elders or experienced millers, but there is no access to extension services, vocational training, or institutional support.

Microfinance institutions

According to the Operations Manager of Bulaal Microfinance, interviewed during the second mission, the institution provides financing to actors across the sesame value chain, including processors, traders, aggregators (middlemen), and sesame oil producers. The support covers working capital, small-scale processing, storage, and market linkage activities. Microcredit is available to smallholder farmers, cooperatives, input suppliers, traders, and processors.

Eligibility for financing depends on demonstrated involvement in the sesame value chain, business viability, repayment capacity, and *Shariah* compliance (i.e., adherence to Islamic financial principles). Cooperatives must be legally or community recognised, maintain transparent governance structures, and apply joint liability mechanisms. Financing typically supports agricultural inputs, machinery, storage facilities, post-harvest handling, and limited irrigation equipment.

Key risks identified include climate shocks, market volatility, insecurity, and infrastructure gaps.

The CEO of Hogaan Microfinance, interviewed separately, described an approach largely aligned with that of Bulaal Microfinance. Risks are mitigated through careful client screening and continuous monitoring, portfolio diversification, the use of collateral and group guarantees, and close engagement with community structures and development partners. A similar approach was reported by Horseed Microfinance.

All three institutions emphasised their commitment to supporting women, youth, and IDP. They highlighted how strong partnerships with development actors, combined with targeted support to women, youth, and vulnerable groups, are critical to achieving sustainable agricultural growth.

The institutions also underscored the strong potential of sesame production in Somalia, citing favourable agro-climatic conditions, high regional and international demand, and farmers' existing experience with the crop. In their view, sesame could make a significant contribution to food security and export earnings, provided there is improved access to quality inputs, financial services, and strengthened market linkages.

2.5.2 Support services

Due to weaknesses in governance structures, government-led extension services for sesame production are non-existent. Producers are reliant on informal information sources (family, friends and neighbours) and NGO.

Low productivity, due to limited agricultural skills, was highlighted as a major second challenge. In the riverine regions, a large proportion of historical farming communities have left the area due to security concerns. Most remain in IDP camps or in cities. Furthermore, there are no training provided to new farmers settling in these areas (STAG and EU, 2021).

There are, nevertheless, various types of support provided FAO and USAID, in partnership with national bodies (GEEL) which have played an important role in implementing experimental farming plots and testing seeds' varieties. The FAO model of Farmer Field School (FFS) was identified as one of the means of providing increase in agricultural production through a participatory, learning discovery extension approach where farmers are empowered to make sound and informed production decisions on their farms in Somalia. The final goal of FFS is to make farmers their own extension agents (FAO, 2012).

Community Base Organisations (CBO) play a crucial role in managing, maintaining and governing community resources and disseminating good agricultural practices. They are supported by the NGO and international donors.

2.6 Flows linking actors of the sesame value chain

This section describes the main flows and key actors within the sesame value chain. A diagram, illustrating that structure, developed in close collaboration with national team members during the second mission in Nairobi, is presented below, in Figure 2.7.

Smallholder family farmers and commercial farmers sell sesame grains to small village traders or collectors (*middlemen*) – who sell to *wholesalers* and *exporters*. The middlemen in general sell to another larger agent (*brokers*). Wholesalers are larger suppliers who have better capacities in terms of finance and other facilities than the others. They resell the sesame seeds to retailers, oil millers, and exporters. Most oil millers – with the exception of Som Seed Agri – sesame grains from a chain of local actors rather than directly from farmers, such is the case of middlemen. They also buy from wholesalers in local markets. They do not buy directly from farmers, because these intermediaries reduce transaction costs, ensure steady supply, and manage transport and storage. Exporters buy mainly from middlemen or brokers. They own cleaning machinery that allow to pack cleaned sorted grains per weight (such is the case of an exporter based in Mogadishu interviewed during first field mission).

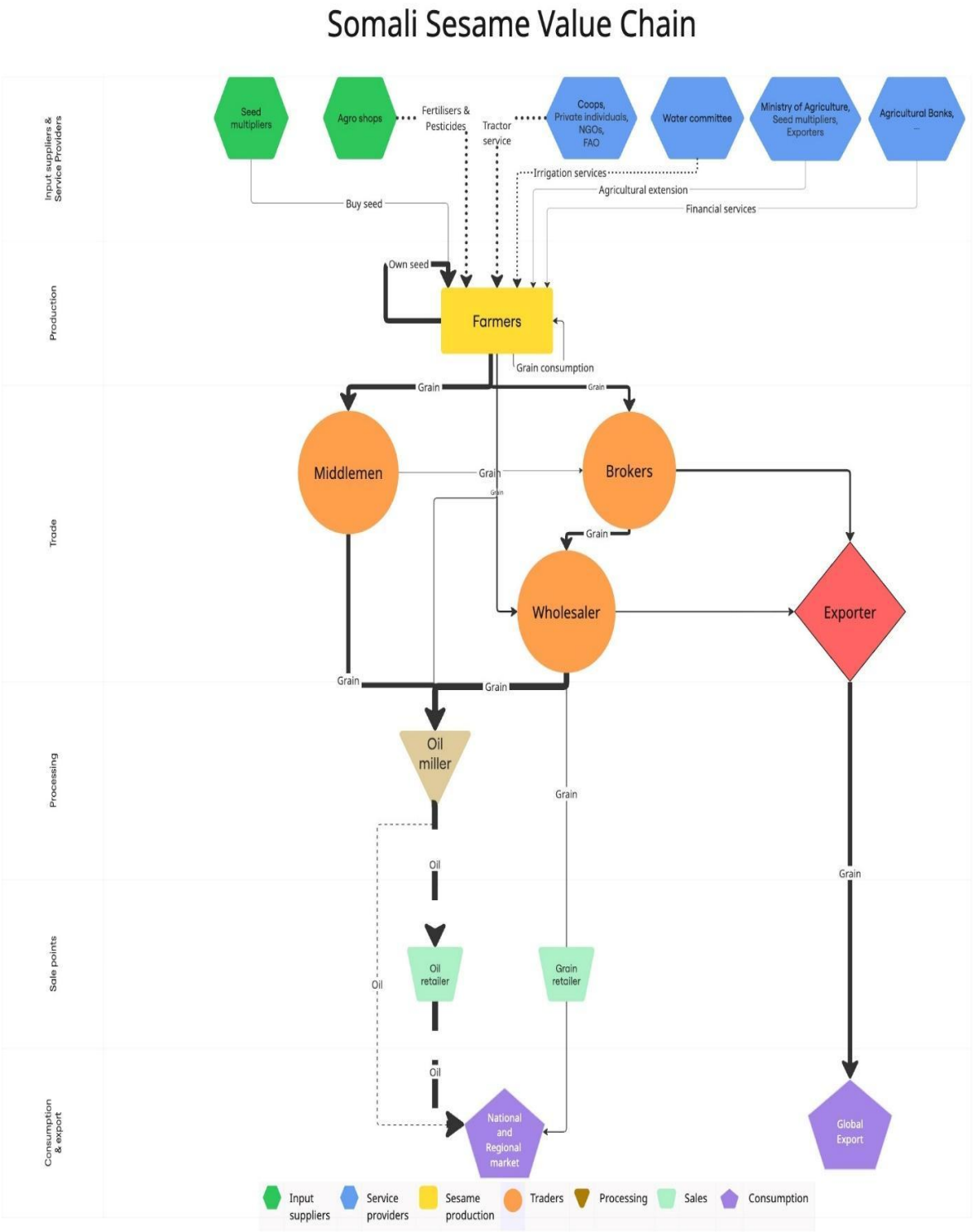

FIGURE 2.8: SESAME VC IN SOMALIA – FLOW AND ACTORS
Source: Authors

Following the data presented in sub-section 2.1 on the major trends, figure 2.9 displays a graph flow transacted across the direct stakeholders of the sesame VC.

FIGURE 2.9 – FLOWS GRAPH OF THE VOLUME (IN KG) OF SESAME VC PRODUCTS
Source: Authors

Acronyms used in Figure 2.9
PSAJ : Primary production of sesame in riverine system (Lower and Middle Shabelle regions)
CPAJ : Trade function of the primary production in the riverine system
UPAJ : End use function of the primary production in the riverine system
PBSB : Primary production of sesame in rain fed system (Bay region)
CPSB : Trade function of the primary production of sesame in rain fed system
UPSB : End use function of the primary production in the rain fed system
CWLM : Wholesale marketing trade; CMDM: Middleman marketing trade; CEXM : Export in global markets
TCOM : Camel oil miller; TOMM: Small and medium oil miller; TSOM : Som Seed Agri oil miller
CROM: Retail in sesame oil; CRGM: Retail in sesame grain

Unit price across the value chain

From the data collected in November 2025 and January 2026 from sesame stakeholders in Somalia, unit prices were, among others, documented. In average, the producer price is around US$1/kg. Middlemen, wholesalers, and exporters who buy grain from producers via brokers sell on their own grain at US$ 1.2/kg. Most oil millers except for Som Seed Agri source the grain from the middlemen and wholesalers at that price. The sesame oil produced is sold at US$ 3/litre while the traditional sesame oil produced by camel oil miller, due to its

therapeutic virtuous, is very expensive with a price averaging US$ 6/litre. The retail price is US$ 1.45/kg for grain, US$ 15/bag of 50kg for *maankaal*.

The Afgoye Corridor

The Afgoye Corridor is a strategic transport and trade route between Mogadishu (the capital) and the agricultural town of Afgoye in the Lower Shabelle region (Figure 2.9). It is a roughly 30 km corridor of road and surrounding area and one of the country's most important economic arteries for moving agricultural products from rural production areas into the capital and onward to markets and ports.

For the Afgoye farmers interviewed during the first mission, the Afgoye Corridor *is the farm zone,* it is where it is possible to find Mogadishu traders both as *buyers, transporters, and exporters*. *These are the final sellers to international markets* (Afgoye, KII with farmers' cooperative). The corridor is sometimes affected by security challenges, and checkpoints that can raise costs and disrupt flows. This has implications for sesame and other crop trade. Because agricultural produce like sesame is a major crop and an important income source for many Somali farmers, securing and improving the Afgoye Corridor is a priority for both local livelihoods and broader economic stability. Several infrastructure projects aim to improve this route to facilitate trade and market access (FGS, MOPWH&R Q1-report, 2025).

FIGURE 2.9: THE AFGOYE CORRIDOR (IN RED)
Source: SNTP Lab analysis, Somali Electricity Access Project (MoEWR)

2.7 The organisation and governance

Following the outbreak of civil war, in 1991, the Somali government collapsed, bringing down the central state. The agriculture development projects that were administered by the Government such as policymaking, coordination, supervision, performance monitoring, service delivery and support functions, as well as regulatory frameworks, all ended abruptly. In addition, agriculture infrastructure, such as irrigation facilities, roads, Government support services, education and research institutions throughout the country, were

destroyed and most of the documentation, archives and thus most institutional memory in all sectors of agriculture were lost (SATG and EU, 2019).

The current FGS was inaugurated in 2012, replacing the Transitional Federal Government. Since then, several regions function as federal member states with a high degree of autonomy. Yet, political disputes over power-sharing, constitution and elections continue to create instability. This instability is aggravated by recurrent droughts, famine, population displacement, and fights over grazing/land and water. (International crisis group, 2008).

Somaliland

- Declared independence in 1991.
- Has its own government, army, and currency.
- Seeks international recognition as a sovereign state.

Puntland

- Declared itself an autonomous state in 1998.
- Unlike Somaliland, Puntland does not seek full independence; it sees itself as a federal member state of Somalia.
- It has its own administration and security forces but recognises the idea of a united Somalia under a federal system.

Other Federal Member States of Somalia:

- Galmudug
- Hirshabelle
- Southwest State – Mogadishu
- Jubaland

In recent years, the FGS, in partnership with the international community, has been working towards restoring peace and stability while rebuilding Government institutions in order to provide the basic services and stimulate economic growth through agriculture. The FMoAI has worked with the emerging State Ministries of Agriculture and Irrigation (SMoAI). Due to overlapping legal frameworks between state and federal governments, farmers are subjected to different taxes. There are also illegal taxes collected by Al-Shabaab in the form of grains. These different taxes put the farmers on a great economic burden. (Information collected during the first mission).

Farmers interviewed, consider that the government involvement is limited; most conflicts' resolution are handled by village elders.

INGO provide intermittent support, depending on projects or programmes.

2.7.1 Community Base Organisations

The private sector has been filling the gaps left by the collapse of public infrastructure in communications, finances, education, water supply, and transportation. In some cases, services are delivered through public – private partnership.

NGO and CBO have worked with success playing a crucial role at the village level and in remote areas. (FAO, 2012):

- The *Village Development Committee (VDC)* is a semi-formal governance structure at the village level. Its members are drawn from the local clans in the village. They work as government intermediaries in disseminating governmental information to the local communities, mobilizing communities and

supporting conflict resolution. The VDC has a chairperson, a deputy chairperson, and a secretary. Typically, men outnumber women in these positions due to the community's prevailing patriarchal system.

- The *Village Water Management Committee (WMC)* manages water resources and create community awareness and responsible of water at the village level. The WMC play a key role in managing and preventing conflicts in water resources and participating in hygiene promoting initiatives at the village level.
- The *Natural Resources Management Committee (NRM)* lead the development and implementation of natural resources plans, working closely with the local communities.
- The *Community Animal Health Workers (CAHW)* play an important role in delivering animal health services, veterinary drugs and building local capacities. FGS programme has worked with them by equipping them with skills and knowledge and proper treatment of livestock.
- The *Village Saving and Loans Associations (VSLA)* work as community-based structures that aim to provide access to savings and credit services to people in rural and underserved areas. They also provide a self-help mechanism for exchanging ideas and expertise. Some VSLA are legally constituted and registered with local authorities. They are mostly composed by women.

These different community structures are the entry-points for the Somalia government development programmes. The mediation between the federal government structures and these community structures is jointly done by development parties, NGO, and INGO, together with United Nations Agencies. The considerable dependence of these rural regions on support from the latter – organisations such as FAO and USAID – suggests that, with the current cuts in funding from the United States to these organisations, the continuity of this support is at risk.

A report by FMoAI, Somalia Resilience Programme (SomReP) – Annual Joint Resilience Measurement 2024 – make it apparent the Federal government collaboration with these agencies, in diverse areas.

- Somalia National Development Plan for 2020 – 2024, Intergovernmental Authority on Development (IGAD) Regional Strategy, the African Union (AU) Agenda 2063 which incorporates the 2030 Agenda for Sustainable Development Guiding Principles;
- Natural Resources Management Drought Resilience and Sustainable Livelihoods Programme (I and II) 15-years programme supported by the World Bank (WB) Africa;
- Food and Nutrition Resilience Programme (FNS-REPRO), a four-year programme addressing the causal relationship between conflict and food insecurity supported by FAO;
- Resilient Smallholder Farming Systems programme aimed at Market Access, Trade and Financial Services by World Food Programme (WFP);
- Sustainable Flood Management and Risk Reduction Action by Ministry of Energy and Water Resources (MoEWR) and the UN Environmental Programme – Centre on Water and Environment (UNEP-DHI).

The humanitarian-development consortium Building Regional Communities in Somalia (BRCiS) – led by the Norwegian Refugee Council (NRC) is aimed to strengthen the resilience of vulnerable and disaster-prone communities, helping them cope with crises (like drought, conflict, food insecurity and environmental shocks) and build long-term capacities to adapt and recover. It includes other international NGO such as Concern Worldwide, Save the Children, *Fondazione Cooperazione Emergenza e Sviluppo* (CESVI), and the International Rescue Committee (IRC), among others.

2.7.2 Enabling environment, policies, institutional and societal context

According to FAO, the enabling environment refers to the set of conditions – policy, legal, institutional, and socio-economic – that allow and support effective, equitable, and sustainable development outcomes in agriculture, food security, and rural development.

The Annual Resilience Measuring Report – clearly shows how established and supported community-based structures such as VDC, WMC, NRM, CAHW, VSLA and farmers associations/ cooperatives, operating at the community level, with leading structures and members selected through a participatory and inclusive process, receive support (capacity building, trainings) from international humanitarian organisations and NGO that constitute the operational niches where governance influence occur through:

- Facilitating dialogues among national institutions to stimulate collaboration and data exchange
- Institutionalizing reporting processes within national systems to make them sustainable
- Organizing national technical training workshops

Policies, governmental strategies

At the producer level

There are about 181 registered cooperatives in Somalia. Cooperatives are among the key governance structures at the farmer level. Yet the majority are weak, with a lot of support coming from development projects. (FAO and UNDP, 2024).

At the processing at exporter level

The sesame value chain is slightly better and more structured at the processing at exporter level, where they have an informal platform facilitated by projects such as GEEL and UNIDO which used for lobbying and advocate through the Chamber of Commerce. (FAO and UNDP, 2024). According to the FAO report – Investment Forum 2025 (FAO, 2025) the government of Somalia has recently defined:

Strategies and incentives for investors:

- Investment promotion zones
- Blended Financing opportunities
- No restrictions on the creation of private enterprises
- Opportunities for large-scale commercial farming
- Regional Market Access through COMESA, IGAD, and EAC
- Trade agreements to enhance competitiveness

Trade corridors and environment:

- Export Development Programmes
- Customs Modernisation and One-Stop Border Posts Programme
- Development of Industrial Clusters and Parks
- Enhancing Product Certification for Export.

For sesame production boosting, the government goal is to:

- Increase sesame production by 50% within 5 years (from 50,000 tons in year 1 to 75,000 tons from Year 3 to Year 5).
- Secure a sustainable market for 100,000 producers through the establishment of a sesame oil processing factory.

The role of the EU in supporting Somalia agriculture development

The European Union (EU) actively supports Somalia's agricultural sector through initiatives designed to strengthen resilience, promote sustainable economic growth, and advance long-term development. A flagship programme, OUTREACH II, builds on earlier EU-funded efforts by reinforcing rural livelihoods and fostering economic opportunities while addressing broader social, economic, and environmental challenges. The programme is implemented in close collaboration with the Federal Government of Somalia, relevant state ministries, and private sector actors. OUTREACH II complements other EU-supported initiatives, including PROACT, which focuses on enhancing crop production, agricultural productivity, and water management systems – covering access, efficient use, and conservation of water resources.

The original OUTREACH project (January 2018–June 2019), implemented by SATG with EU support and later advanced by FAO, sought to increase the competitiveness, inclusiveness, and sustainability of agricultural value chains through effective public–private–producer partnerships. It provided technical assistance to Federal and State Ministries on policy, strategy, and legislative priorities, and engaged key stakeholders to identify and prioritise interventions in strategic value chains (SATG and EU, 2019).

Other projects supported by the EU:

- Technical Assistance for Institutional Capacity Building on Agriculture Value Chain & Public Private Partnership Development (launched 2018);
- Irrigation Infrastructure Programme (Global Gateway / Agri value chains & environmental protection)
- Som Seed Agri – Improving Genetic Quality of Seeds in Somalia & Reviving Spate Irrigation in Burao (launched 2016) jointly with the Ministry of Agriculture of Somaliland and the Food and Agriculture Organisations (FAO);
- Integrated Land & Water Resources Management (ILWRM) Project (launched 2019) jointly with FAO Scholarships for Young People in Livestock Sector (through RAAISE project) (launched 2023) jointly with the Somali National University in Mogadishu and is supported by the Food and Agriculture Organisation of the United Nations (FAO);
- Support to EU-Somali Dialogue on Investment and Trade (SDIT) 01/11/2024 to 30/4/2025. Directorate-General for International Partnerships (INTPA)/NBO/2023/EA-RP/0003.

The EU's combines institutional capacity-building, value chain development, infrastructure (water/irrigation/land), human capital (skills/education) and private-sector linkages in the agricultural sector for:

- Improved capacity of Somali institutions to manage agriculture, land and water resources.
- Better seed systems and irrigation infrastructure.
- Investment in value chains and private-sector linkages.
- Strengthening the livestock sector via policy, infrastructure, health services help the whole agricultural economy.
- Linking agriculture with environmental sustainability (land rehabilitation, water management).

2.8 SWOT Matrix

The SWOT matrix in the Table 2.-7 displays the key factors, internal and external that are favourable or unfavourable to sesame value chain development.

INTERNAL	**STRENGTHS** - The sesame value chain in Somalia has deep historical roots and plays a vital role in rural livelihoods and local economies. - Land availability and accessibility in production areas - Water availability in riverine regions - Sesame tolerates water shortages better than many other crops in Somalia - Farmers receive some support from NGO with respect to agriculture, health, education and in case of emergencies - Minimal negative biodiversity impact from sesame production - Community support systems – cultural and religious – are in place contributing to some socio-economic regulation - Young people with an education and capital see opportunities in the sesame value chain - Women can be autonomous in the sesame trade and processing. They are becoming more engaged in no-production segments of the VC - Shifting from wet to dry dehulling process is reducing the environmental impact (water and energy) and removes the salty taste, which improves quality of exported sesame - No excessive pesticides residues found in sesame exported to EU since 2020	**WEAKNESSES** - Limited statistics - Deteriorated irrigation infrastructure - Low agricultural mechanisation, especially in Bay - Sub-optimal fertiliser use - Limited government support for production, processing and export, including limited extension services (GAP) - Non-Governmental Organisations play an important role; their interventions are typically project-based, time-bound, and donor-driven limiting long-term sustainability and institutional continuity. - Lack of research on improved sesame varieties and lack of national and community genebanks for sesame varieties. - Significant negative impact of insecticides on human health - Working conditions constrained by weak labour protections, outdated farming tools, inadequate technological and logistical infrastructure, limited worker organisation, and entrenched socio-cultural norms. - Despite their increasing engagement, autonomy of women in sesame production is limited – gender inequality remains a serious constraint - Weak land and water governance system. Legal pluralism is proving unable to face current challenges - Security related challenges including safety, mobility, informal taxation and transportation - Insufficient market information and communication - Many traders and exporters do not understand EU needs in terms of quality standards, which can affect the reputation of sesame from Somalia as a whole - Lack of storage infrastructure and inadequate storage conditions / management

		- Dunyar, the endogenous variety, is not a pure white variety (white variety is preferred and gets a higher price in international market)
EXTERNAL	**OPPORTUNITIES** - Increased mechanisation could increase the attractiveness of the sector - Targeted gender-sensitive interventions would benefit women empowerment with positive impacts in food security and rural livelihoods in general - Dunyar variety characteristics (sweetness, medium oil content and blending well) are sought after for tahini production - Significant external market demand (EU, Japan, Gulf countries, …) for Somali sesame, though quantity exported is limited - Improving storage conditions and management practices would facilitate compliance with international standards - International market competition	**THREATS** - Climate related disasters (droughts, floods, increased pest pressure) - Soil erosion due to heavy rains and floods - Sensitivity of sesame to flooding and waterlogged soils - High pest pressure - International aid dependency and uncertainty thereof - Security related challenges - International market competition - Young people losing interest in the sesame value chain because of low access to capital, land tenure and water for irrigation

TABLE 2-7: SWOT MATRIX
Source: Authors

3. CONTRIBUTIONS OF THE VALUE CHAIN FOR ECONOMIC GROWTH

3.1 Profitability & Sustainability of actors

Profitability of actors involved in the value chain is assessed following three indicators: (i) net margins; (ii) RoT, and (iii) the benefit/costs (B/C) ratio. The RoT is ratio of the NOP to the value of production while the B/C is the ratio of NOP to the total costs of production: intermediate goods and services (IGS), taxes, interests on loan, capital rental, and depreciation. The sections below discuss successively these indicators of profitability.

3.1.1 Net margins

All the sesame value chain stakeholders are capturing positive margins even though they strongly differ from one actor to another. The highest margins are perceived by farmers growing sesame in rain-fed system (50%), camel oil millers (38%), Som Seed Agri oil miller (26%), and farmers of the riverine system (22%). Other oil millers and traders, both wholesalers and retailers' producers have comparable margins averaging from 5% to 14%. Within the oil processing, a technical coefficient of 0.48 is used to convert grain into oil for all oil millers except for camel oil millers where this conversion coefficient is 0.43. Actors with limited margins such as Som Seed Agri, middlemen, and wholesalers can get high profits thanked to large handled volumes. The net margins for oil millers were calculated by adjusting their total costs by the share of sesame oil in the total value of output (oil + *maankaal*). The net margins captured by the VC stakeholders are similar to the RoT discussed in the section below.

3.1.2 Return on turnover and benefit/cost ratio

Farmers

In this study, there are two production systems: riverine or irrigated system alongside the Juba and Shabelle rivers and rain-fed system. The irrigated system was documented in Afgoye and Jowhar while the rain-fed system was investigated in the Bay region. Comparison of the two production systems reveal the following features:

- Intensity in the use of seeds: on the basis of the data collected, there is no huge difference in the sowing intensity: 6.2-7.5kg/season (*Gu* or *Deyr*). This volume is doubled for a year-based analysis
- Intensity in the use of fertilisers: the volume of fertilises in the riverine system is the highest maybe due to the role of NGOs in the dissemination of good agricultural practices (GAP)
- Expenses in the agronomic practices (ploughing, harrowing, furrowing, planting, weeding, fertilisers and pests' application, harvesting) are the highest in the riverine system

Despite an intensive production system in both intermediate consumptions and agricultural practices, the lowest yields were registered in the irrigated system. This is due to flood events that have damaged the irrigation canals and farmland, altering production patterns particularly in *Deyr* 2024 and *Gu* 2025. In the rain-fed system, despite low investments in intermediate consumptions (seeds, fertilisers, and pesticides) and agricultural practices, yields were relatively better (407 kg/ha) than in the irrigated system (387.5 kg/ha), generating a more interesting net operating profit (US$ 403.29/ha/year against US$ 166.76 got in the riverine system (Table 3-1).

SPECIFICATION	FARMER IN RIVERINE SYSTEM	FARMER IN RAIN FED SYSTEM
Quantity (kg) of sesame annually handled	775	814

Sales revenues (US$)	775	814
Subsidies	0	0
Seeds	12	9.92
Fertilisers	337.62	187.5
Pesticides	18.56	3.31
Packaging	3.6	4.06
Agricultural practices	231.4	169.85
Other services	5	36
Wages	0	0
Interest	0	0
Taxes	0	4
Land fees	0	0
Depreciation	0.07	0.13
Net operating profit	166.76	403.29

TABLE 3-1: STRUCTURE OF REVENUES AND COSTS IN THE RIVERINE AND RAIN-FED PRODUCTION SYSTEMS

Source: Authors

The structure of the costs of production displays the relative importance of fertilisers (43% in the riverine system against 23% in the rain-fed system) and services related to agricultural practices (29% in the riverine system against 21% in the rain-fed system), as in Figure 3.1. The other components of the costs such as the wages, interests on loan, taxes, and land fees are almost nulls. Farmers pay taxes in the Bay region while this is not the case in Afgoye and Jowhar; this is perhaps a type of tax perceived by Local state. Depreciation is negligible due to low mechanisation level at the country level. From FAO (2019), mechanisation level in Somalia is among the lowest in the World: 0.1 tractor/1,000 ha against 13.6 in Sub-Saharan Africa (SSA), and 200 at the Worldwide. Furthermore, agricultural practices are performed in the form of services, hence hand tools are of minor importance at the producer level.

By accounting for sale receipts and costs required to produce 1kg of sesame grain sold at US$ 1 in both systems, the NOP represents 21% in the riverine system against 49% in the rain-fed system. This NOP is similar to the margins derived in the previous sub-section.

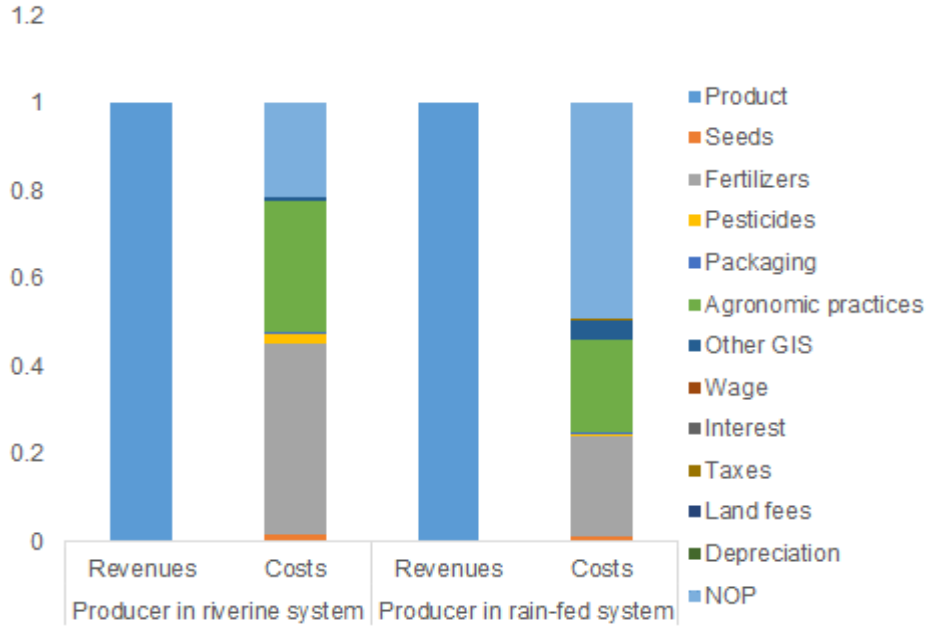

FIGURE 3.1: PRICE OF SESAME GRAIN AND COMPOSITION ITS PRODUCTION COSTS IN THE RIVERINE AND RAIN-FED SYSTEMS OF PRODUCTION

Source: Authors

Among farmers, sesame growers in the rain-fed system are getting the highest values of RoT and B/C, as in Figure 3.2. Data collected from the farmers show that the yield is the highest in the Bay region compared to Afgoye and Jowhar. Furthermore, the intensity of fertilisers is high in the riverine system compared to rain fed system. Hence, farmers in the Bay region have relatively high yields while expending less for intermediate consumptions. This leads, *ceteris paribus*, to high NOP. While the main difference between riverine and rain fed systems is the water availability, this finding is consistent with the fact sesame doesn't require water along all the growing season. Water availability is mainly required at the sowing phase. Hence, the profitability of an irrigation infrastructure cannot be assessed in considering only sesame but rather in accounting for other crops such as bananas or vegetables able to take advantage of water availability. Given that data used in this analysis were collected during *Deyr* 2024 and *Gu* 2025 seasons, climatic conditions were unfavourable to this crop particularly in the irrigated area.

Furthermore, to be more effective, fertilisation formulas need to be determined depending on the natural soil fertility.

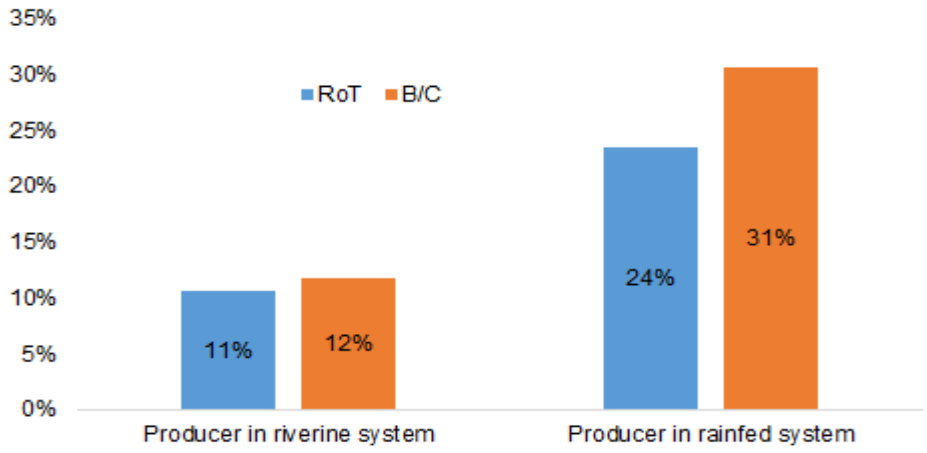

FIGURE 3.2: RETURN ON TURNOVER AND BENEFIT/COST RATIO IN RIVERINE AND RAIN FED SYSTEMS
Source: Authors

Acronyms used in Figure 3.2

RoT: Return on turnover

B/C: Benefit out of costs ratio

Intermediaries

The main characteristic common for all the intermediaries is the highest share of the direct intermediate consumption in the total costs of production. They represent from 57% (for exporters) to 88% for retailer of sesame oil. The transport costs are the most important (27%) in the budget operation of the exporter due to both domestic and international transportation costs. Transportation costs only represent between 5 and 8% for the middleman and the wholesaler respectively. Transportation costs are of lesser extent for retailers. They use cheapest means of transportation (wheelbarrows) and afford short distances to reach market places compared to exporters, wholesalers, and middlemen who source grain sometimes from remote farms. Wages, interests, capital rent, and depreciation are negligible for all these stakeholders. There is an unequal repartition of the net operating profit across the intermediaries. The NOP represents 27% of the resources for the retailer of oil, ranges from 11-14% for the exporter and retailer of grain while it is of lesser extent (lesser than 10%) for the middleman and the wholesaler. Trading activities are not subsidised; hence the revenues are made of the sale receipts.

Stakeholders handling large volumes of commodity are capturing the highest NOP. Table 3-2 displays the volumes of sesame grain or sesame oil annually traded as well as the structure the costs of production of the intermediaries.

Among the intermediaries, the exporters have the highest RoT (13.8%) and B/C ratio (16%), as in Figure 3.4. It is worth to note that both middlemen, wholesalers and exporters are sourcing sesame grain from the farmers. Given that farms are located far from the market places, exporters, and at lesser extent wholesalers have advantage of economies of scale, compared to middlemen, thanked to consistent volumes they are handled.

SPECIFICATION	MIDDLEMAN	WHOLESALER	EXPORTER	RETAILER OF GRAIN	RETAILER OF OIL
Quantity (kg) of sesame annually handled	240 000	1 800 000	2 534 400	18 000	10 000
Revenues					
Sales revenues (US$)	288 000	2 160 000	4 435 200	26 100	34 000
Subsidies	0	0	0	0	0
Costs of production					
Intermediate consumptions from the VC	240 000	1 800 000	2 534 400	21 600	30 000
Packaging	1 920	14 400	50 688	144	0
Transportation	24 000	108 000	1 136 678.4	110	150
Storage services	2 400	0	0	180	0
Other services	1 200	18 000	101 380	200	0
Wages	0	0	0	0	0
Interest	0	0	0	0	0
Taxes	0	18 000	0	120	0
Land fees	0	36 000	0	180	0
Depreciation	25	230	1 000	30	10
Net operating profit	18 455	165 0	611 060	3 538	3 840

TABLE 3-2: STRUCTURE OF REVENUES AND COSTS OF PRODUCTION AT THE INTERMEDIARIES LEVEL
Source: Authors

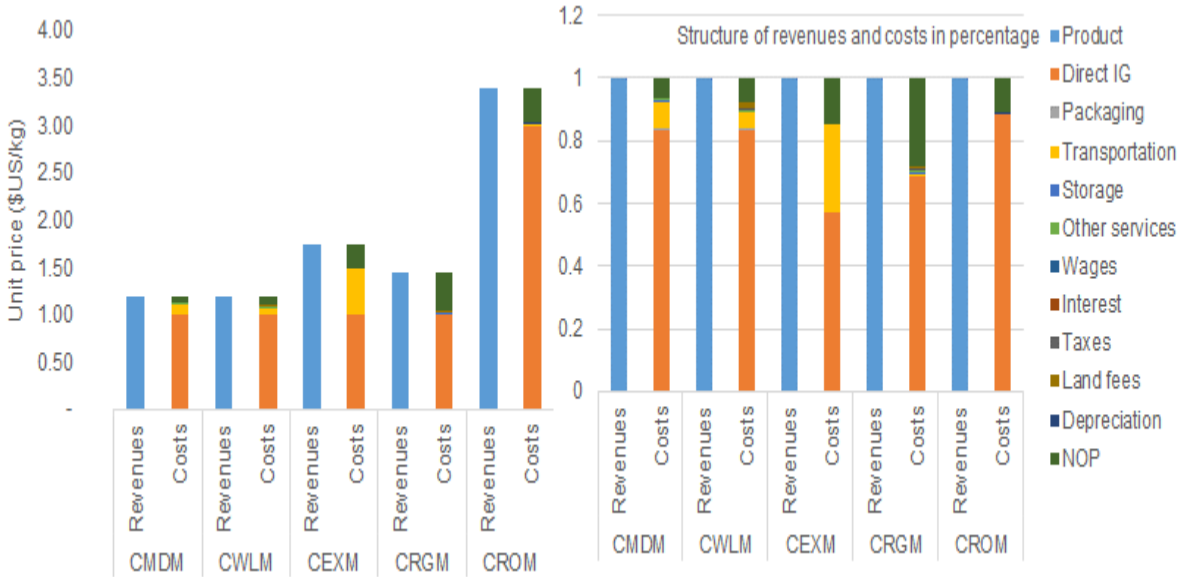

FIGURE 3.3: STRUCTURE OF REVENUES AND COSTS OF PRODUCTION IN ABSOLUTE VALUE (ON THE LEFT SIDE) AND IN PERCENTAGE (ON THE RIGHT SIDE) FOR INTERMEDIARIES IN THE SESAME VALUE CHAIN
Source: Authors

Acronyms used in Figure 3.3
CWLM: Wholesaler; CMDM: Middleman; CEXM: Exporter in global markets; CRGM: Retailer in sesame grain; CROM: Retailer in sesame oil

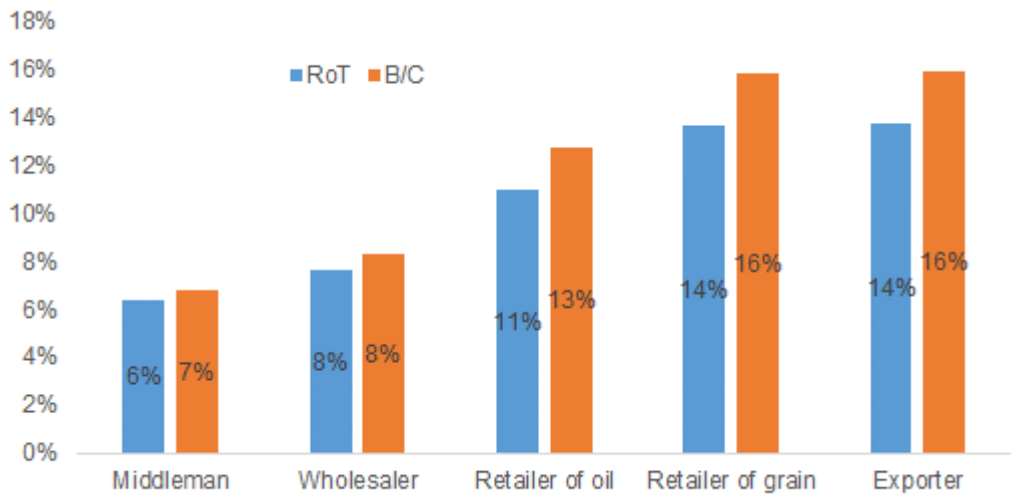

FIGURE 3.4: RETURN ON TURNOVER AND BENEFICE/COST RATIO FOR MIDDLEMEN, EXPORTERS, WHOLESALERS, AND RETAILERS
Source: Authors

Oil millers

In the category of oil millers, there are three types of actors: (i) the camel traditional oil miller using animal energy to make oil milling machine working; (ii) the small-medium oil millers; and (iii) the Som Seed Agri oil miller. The traditional camel oil miller is characterised by a lower oil extraction rate around 42.86% while for other oil millers, this rate increases to 48% (Table 3-3). However, the oil from traditional oil millers is the most expensive due to its therapeutic virtuous. Its price is around US$ 6/litre that is the double of classical sesame oil from small-medium oil millers. Hence, traditional camel oil is benefiting from a niche market where consumers well informed on the value addition of this oil in terms of health benefits are willing to pay this premium price.

Camel oil miller's revenues are only from the sales of the traditional sesame oil; the *maankaal* (by-product) is not sold but it is instead used as an internal intermediate consumption to feed the camels. In addition, this type of oil miller doesn't but *maankaal* from other oil millers. Other intermediate consumptions such as grass are used to feed camels. The structure of revenues for small-medium oil millers and Som Seed Agri as well, is made of sales revenues from sesame oil representing 91% and the value of the by-products (mainly *maankaal*) contributing to 9% of the total revenues.

Som Seed Agri was included in the analysis as a particular oil miller due to the fact the plant is sourcing grain from farmers while other oil millers are buying grain from wholesalers or middlemen (Figures 3.5 and 3.6). This sesame processing company is manly exporting dehulled (white) seeds to European and Asian markets. Grain that fails to meet export markets food safety requirements are locally processed into oil.

The costs of production for all types of oil millers are mainly the expenses in raw material, i.e., sesame grain. The share of raw in total costs is varying from 47% to camel oil miller to 63% for Som Seed Agri and 75% for small-medium oil millers (Figure 3.5). Wages paid along the whole value chain are concentrated on the oil milling section. They represent 6% of the total costs for all oil millers except for Som Seed Agri where they are relatively low (1%). Energy and packaging represent 2-3% of the total costs. For camel oil millers however, there are no energy expenses but animal feeding instead. Nor, there are no packaging expenses given that final consumers bring their packaging to buy traditional sesame oil. Other costs components such as transportation, storage, repairing, and cleaning services, taxes, and interests to loan are of limited extent. Land fees are null for Som Seed Agri that has its own building. Other oil millers are allocating 1-4% of their

total costs to the capital rent. Conversely, Som Seed Agri and camel allocate 5% of the total budget to capital depreciation (milling machine, and building) for the first, camel and oil presses for the second.

SPECIFICATION	CAMEL OIL MILLER	SMALL-MEDIUM OIL MILLER	SOM SEED AGRI
Quantity (kg) of sesame annually handled	10 080	78 000	303 750
Quantity (litres) of sesame oil	4 320	37 440	145 800
Oil extraction rate (%)	42.86	48.00	48.00
Sales revenues (US$) from oil	25 920	112 320	437 400
Sales revenues (US$) from by-products	-	11 700	45 562.5
Subsidies	0	0	0
Intermediate consumptions from the VC	12 096	93 600	303 750
Packaging	86.4	2 184	10 692
Energy		3 600	10 800
Other intermediate consumptions	920	-	-
Transportation	0	1 500	-
Storage services	0	-	-
Reparation		400	1 000
Other services (cleaning)	180		-
Wages	1 440	7 200	5 400
Interest	0	2 240	-
Taxes	100	90	3 037.5
Land fees	1 080	1 200	–
Depreciation	1 200	666.66	24 000
Net operating profit	8 817.20	11 340	124 283

TABLE 3-3: STRUCTURE OF REVENUES AND COSTS OF PRODUCTION AT THE OIL MILLERS LEVEL

Source: Authors

Thanked to the niche market where traditional sesame oil is valued at higher price, camel oil miller is accordingly characterised by higher RoT (34%) and B/C (52%). Likewise, Som Seed Agri has interesting RoT (26%) and B/C ratio (35%) thanked to the cheaper grain sourced directly from farmers. Margins (9%) and B/C ratios (10%) for small and medium oil millers are the lowest because they are sourcing expensive grain for intermediaries (middlemen and wholesalers).

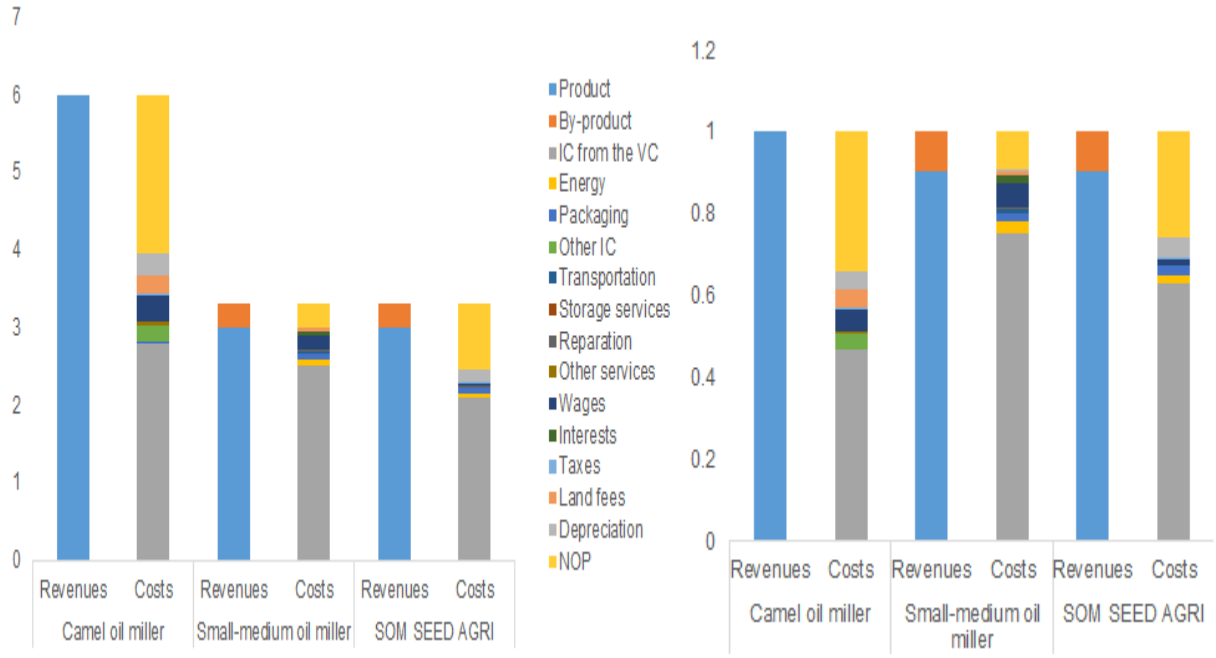

FIGURE 3.5: PRICE OF SESAME OIL AND THE COSTS STRUCTURE OF ITS PRODUCTION

Source: Authors

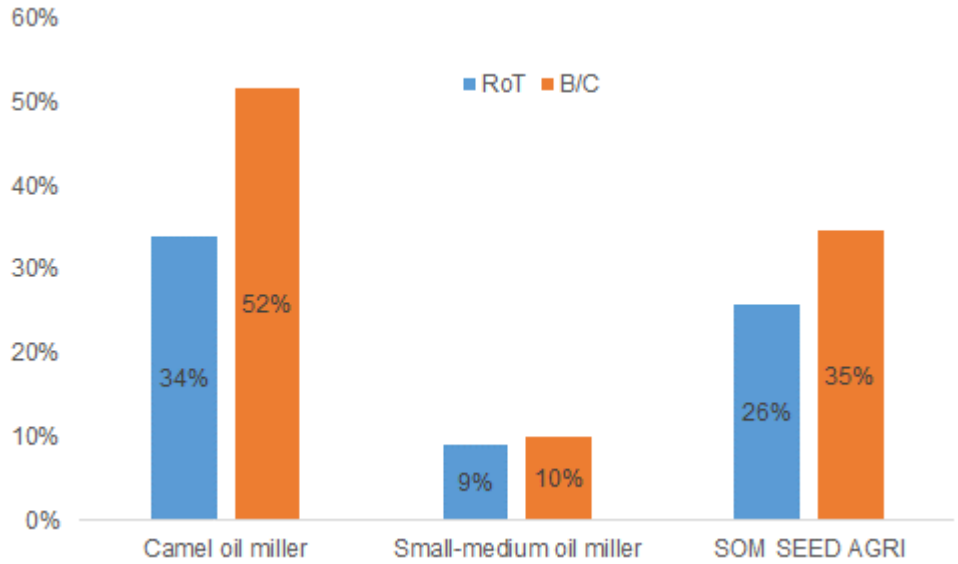

FIGURE 3.6: RETURN ON TURNOVER AND BENEFICE/COST RATIO AT THE OIL MILLER'S LEVEL

Source: Authors

3.2 Total effects within the national economy

Consolidated accounts within the VC

The total effects of the sesame value chain within the national economy are derived from the consolidation of the accounts of the direct stakeholders of this VC, i.e., farmers, intermediaries, and oil millers. The total value production is of US$ 52.62 million. The total intermediate consumptions in goods and services are estimated to US$ 32.04 million representing 61% of the total value of the production. Hence, the direct value added (VAD) is of US$ 20.57 million, representing 39% of the total value of the production. The benefits (NOP) captured by the direct stakeholders of the sesame value chain are estimated to US$18.07 million, representing 34% of the output in value. Wages paid within the sesame VC represent only 2% of the consolidated output. Other components such as taxes, interest, land fees, and depreciation are of lesser extent (Figure 3.7).

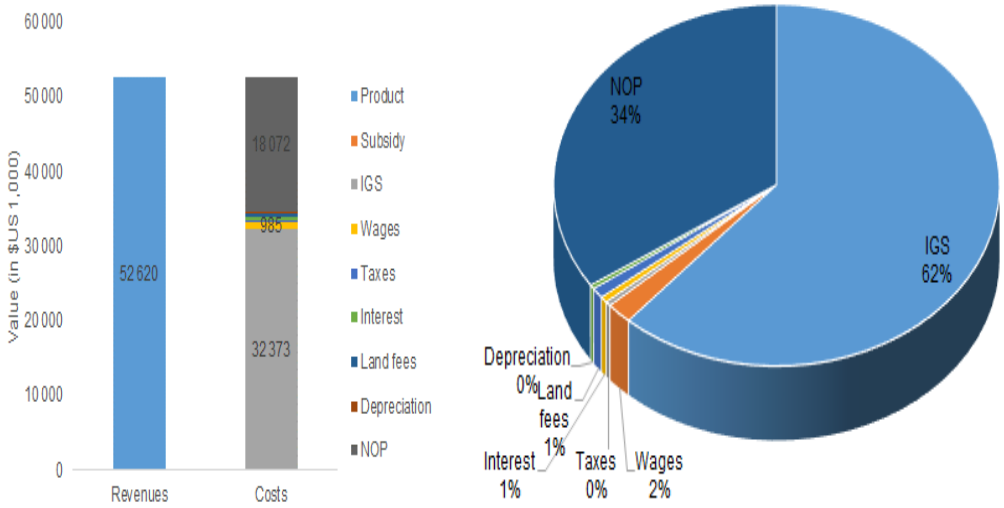

FIGURE 3.7: CONSOLIDATED REVENUES AND COSTS IN (US$ 1,000) OF THE SOMALI SESAME VALUE CHAIN IN 2025
Source: Authors

The composition of the direct value-added reveals that the NOP represents 88% while wages represent 5%, taxes 3%, land fee 2%, and financial charges and capital depreciation 1% (Figure 3.8). These findings especially the largest share of the NOP in the VAD indicate that activities performed within the sesame value chain are really profitable.

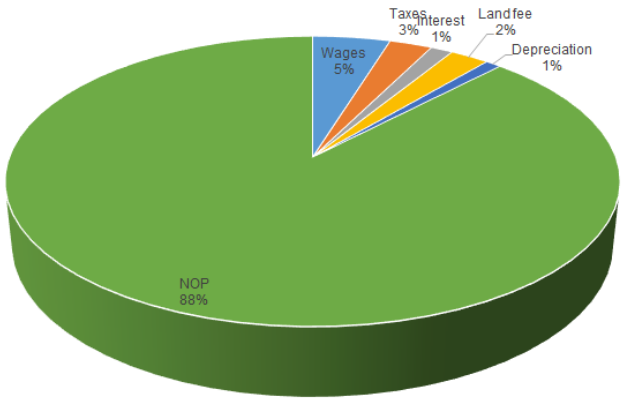

FIGURE 3.8: COMPOSITION OF THE DIRECT VALUE ADDED WITHIN THE SESAME VALUE CHAIN
Source: Authors

The composition of the direct value-added reveals that the NOP represents 88% while wages represent 5%, taxes 3%, land fee 2%, and financial charges and capital depreciation 1% (Figure 3.9). These findings especially the largest share of the NOP in the VAD indicate that activities performed within the sesame value chain are really profitable

As seen above, the sesame VC has limited direct value added (39%) while the related intermediate consumptions of goods and services (IGS) represent 61%. This suggests that, through its demand of IGS, the sesame VC is creating value added in other sectors of the Somali economy. The sections below derive the indirect effect of sesame VC on the rest of the national economy. The composition of IGS reveals that consumables from the industry (fertilisers, chemicals, jerry cans, and empty bags) represent 47% of the total IGS consumed (Figure 3.9). Intermediate consumptions from the agricultural sector (grass, seeds) only represent 2%. The share of services related to the agricultural practices (land preparation, sowing, furrowing, harrowing, fertilisers and chemical application, weeding, harvesting) is around 30%. Logistics services such as domestic and international transportation, storage services, loading and unloading represent 18% of the total IGS budget. Other services non specified elsewhere only represent 2% while electricity doesn't exceed 1% of the total costs allocated to IGS.

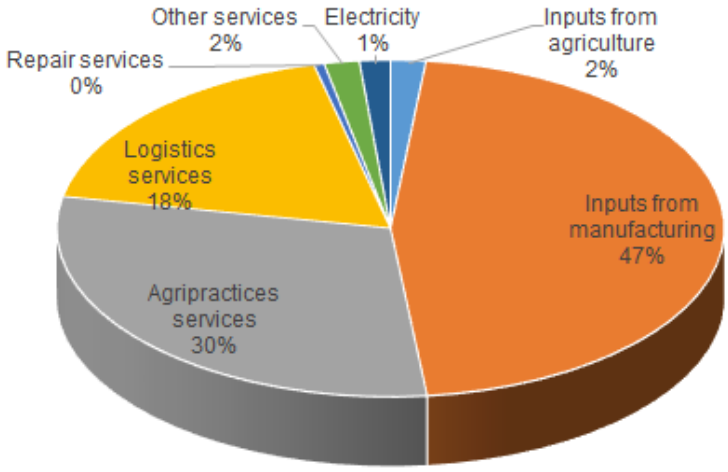

FIGURE 3.9: COMPOSITION OF THE INTERMEDIATE GOODS AND SERVICES CONSUMED WITHIN THE SESAME VC
Source: Authors

Rationale behind the computation of macroeconomic effects indicators

The sesame VC is characterised by a direct accounting for 39% of the output while the IGS represent 61%. This finding means the VC is creating, through its demand in intermediate consumption of goods and services, indirect value added in other sectors of the national economy. Indeed, the local IGS consumed within the sesame VC can are outputs from other industries within the national economy. This output can be split into indirect value added (level 1) and intermediate consumptions of goods and services (IGS level 1) that can be either imports (level 1) or local IGS. Likewise, local IGS are again output from other industries within the national economy. Their production has required local IGS (level 2) and imported IGS (imports of level 2) while creating again an indirect value added (level 2). In doing so, the direct IGS are equivalent to the sum of indirect value added created and the imports. Hence, the total value added generated by the sesame VC is the sum of its own value added or direct valued added and the indirect value added induced in other compute this breakdown of output into value added, imported and local intermediate consumptions, data on intersectoral exchange flows or input-output (I-O) tables are required. These I-O are in most of the countries available in the national account statistics.

Due to the lack of national input-output tables from the Somali National Bureau of statistics (SNBS), alternative databases were investigated. The input-output table used in this analysis is valid for Somalia in 2017 and is taken from the Eora global supply chain database consisting of a multi-region input-output (I-O) table (MRIO)[2] matching environmental and societal satellite accounts for several countries. Assuming that linkages across sectors in terms of exchanged intermediate consumptions are more structural and hence timeless, this I-O table is used to derive indirect value added generated by the sesame VC on the rest of the national economy.

National macroeconomic data

Data Macroeconomic data are taken from the World Development Indicators (WDI) database/World Bank Group completed with relevant reports from the Federal Government of Somalia (FGS). Table 3-4 displays key macroeconomic taken from this database to generate the required indicators related to the contribution of sesame value chain within the national economy. The latest available data are of 2024.

#	MACROECONOMIC VARIABLEE	VALUE	COMMENT
1	Gross National Product (GDP) in current US$ billion	11.97	
2	National Agricultural GDP in current US$ billion	7.78	Agriculture, forestry, and fishing constitute around 65% of the national GDP
3	Gross National Income (GNI) in current US$ billion	12.21	This is equivalent to the Disposal income
4	National exports (current US$ billion)	3.73	
5	National imports (current US$ billion)	11.86	
6	State budget (current US$ billion)	1.084 [a]	
7	Sesame value chain exports (US$ million)	14.87	
8	Total wages (US$ million)	356.84	These are the formal total wages paid the Somali Federal Government (FGS) in 2024 [b]

TABLE 3-4: MACROECONOMIC DATA VALID FOR 2024 USED TO GENERATE SESAME EFFECTS INDICATORS WITHIN THE NATIONAL ECONOMY

SOURCE: DATA IN TABLE ADAPTED FROM [A] DAWAN AFRICA (2023); AND [B] MINISTRY OF FINANCE, REVENUE DIRECTORATE (2024)

Direct and indirect effects of the sesame value chain

Table 2-5 displays direct and indirect effects attributed to the sesame V; the coefficients used to compute the indirect effects are provided in annex VIII. The disaggregation process of local intermediate goods and services into indirect value added and imports has covered 79.54% of the IGS. Indeed, only IGS valued to US$ 6,555.24 million out of US$ 32,045 million are not disaggregated. Direct effects related to imports are null given that no direct stakeholder from the VC is importing himself intermediate consumption.

VARIABLE	DIRECT EFFECTS	INDIRECT EFFECTS	TOTAL EFFECTS
Imports	0.00	6 357.41	6 357.41
IGS not disaggregated		6 555.24	6 555.24
Value added			
Wages	985.17	3 061.57	4 046.74
Taxes	542.03		
Subsidy	0.00		
Tax (+) Sub (-)	542.03	46.76	495.27
Interest on loan	282.80	0.00	282.80

[2] For further details, visit https://worldmrio.com/

VARIABLE	DIRECT EFFECTS	INDIRECT EFFECTS	TOTAL EFFECTS
Land fee	494.75	0.00	494.75
Depreciation	197.97	1 905.84	2 103.81
Net operating profit	18 072.00	14 210.72	2 282.72
VA not disaggregated		1.18	1.18
VA total (VAT)	20 574.73	19 132.75	39 707.28

TABLE 3-5: DIRECT AND INDIRECT EFFECTS (IN US$ 1,000) OF THE SESAME VALUE CHAIN
Source: Authors

In accordance to the content of the Table 3-5, the total VC output can be split into: imported intermediate of goods and services (12%), local intermediate consumptions not disaggregated (12%), wages (8%), depreciation (4%), net taxes (1%) and land fee (1%) while the net operating profit is 61% of the total resources (figure 3.10). This VC output breakdown differs obviously from the content of Figure 3.10 given that IGS have been disaggregated into value added and imports.

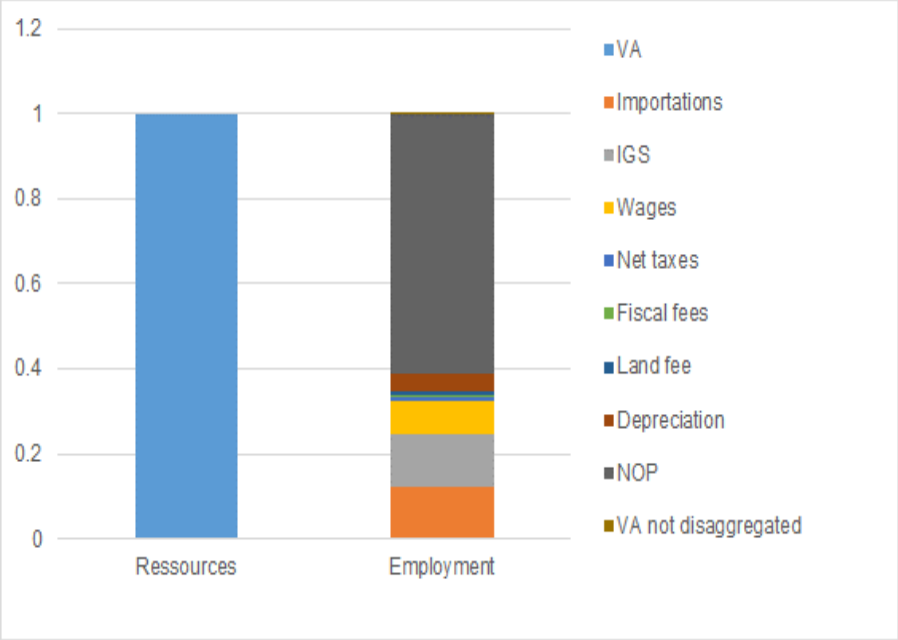

FIGURE 3.1: BREAKDOWN OF THE TOTAL VAD (DIRECT AND INDIRECT EFFECTS)
Source: Authors

Table 3-6 displays the macroeconomic effects indicators derived from the computation described above. Results indicate that sesame VC contribute at 0.3% to national GDP and 0.5% to the national agricultural GDP. Its (indirect) contribution to national imports is 0.1% while sesame exports represent 0.4% of the national exports of goods and services. The sesame VC trade balance is estimated at US$ 8.52 million representing 0.1% of the national imports. Even though the activities within the sesame VC are not subsidised, the contribution of this VC to the national budget is of lesser extent (0.5%) due meaningless taxes. Likewise, wages paid within the sesame VC only represent 1.2% of the total official compensations to workers.

On the other side however, despite its weak contribution to the major macroeconomic aggregates, the sesame VC is well integrated within the national economy. Indeed, the total value added generated represents 75.5% of the total out estimated to US$ 52.62 million indicating a good integration to the national economy. FAO (2005) interprets the VAT/VC output ratio above 70% as an indicator of strong economic integration. While once need to be precautious in making such interpretation while comparing countries, there is no doubt with

respect to the share of imports in the VC output. The sesame VC is not imports-based oriented, it is instead more inward-looking, that is contributing to the domestic economic growth.

INDICATORS	VALUE
Total value added (VAT)/VC output	75.5%
Total value added (VAT)/GDP	0.3%
Total value added (VAT)/ agricultural GDP	0.5%
VC total imports/National total imports	0.1%
VC total exports/National total exports	0.4%
VC trade balance	8 517.6
VC trade balance/National imports	0.7%
VC total net transfers/State budget	0.5%
VC total wages/National wages	1.2%
VC total disposable income/Gross National Income	2.6%

TABLE 3-6: MACROECONOMIC EFFECTS INDICATORS OF THE SESAME VALUE WITHIN THE NATIONAL ECONOMY

Source: Authors

3.3 Competitiveness and viability within the international economy

The analysis of the VC competitiveness and its viability within the international economy is based on a comparison between the economic performances under the current/observed situation to that would prevail in the absence of price distortion induced by trade policy measures or market failures on the price of tradable goods (output and IGS) and non-tradable domestic factors (labour and capital). When the analysis is limited price distortion, it is named *parity price* analysis while the *comparative advantage* analysis extends the analysis to trade policies and market failure.

Somalia is experiencing production volatility due conflict, poor infrastructure and climatic shocks. Severe droughts and flooding hinder consistent harvests forcing reliance of imports to meet domestic needs during bad years. For these reasons trends in production, exports, and imports are unpredictable. On the basis of FAOSTAT database however, Somalia is longer importing sesame since 2020.

Within the Horn of Africa (HoA), the sesame VC benchmarking can be made with Ethiopia, Sudan, and Kenya. In effect, sesame has become a 'strategic conflict commodity' in both Somalia, Ethiopia, and Sudan. Groups in conflict in these countries are controlling production of sesame and capturing profits from its trade to sustain their war efforts. Kenya is a neighboring country of Somalia interesting for the cross-trade.

There is no trend in external trade of sesame seeds. Imports and exports strongly depend on the Climate conditions. Exceptionally during bad years characterised by flooding or severe droughts, Somalia imports sesame from the Horn of Africa and East African countries (Sudan, Ethiopia, Kenya, and Tanzania). By considering a CIF price of US$ 1.24/kg and an ad-valorem tariff rate of 25% raising domestic price to US$ 1.55/kg. Even though this happen exceptionally, domestic farmers are protected via trade policies. On the export's sides, custom services costs US$40 /ton. Officially however, there are no export taxes applied to sesame seeds. Analysis shows a domestic resource cost of 0.49 indicating that exchanged commodities are more valued than the domestic factors of production used. Nominal protection coefficient (NPC) is 1.24 whilst the Effective Protection Coefficient (EPC) is 1.37 suggesting local farmers are protected against foreigners' competitors.

3.4 Comparison of sub-chains

The Somali sesame value chain is mainly characterised by two production systems: riverine or irrigated system along the Juba and Shabelle rivers on the one hand and rain-fed system more vulnerable to climatic shocks. Floods and droughts are most frequent in Somalia and constitute, along with poor export infrastructure, and internal conflict, the key drivers of poor competitiveness of the country on export markets. However, the two production systems cannot be interpreted as sub-chains for the following reasons:

- The price of sesame of sesame produced within the 2 farming systems is almost the same
- Sesame varieties grown in the two product systems are almost the same
- The sesame grain produced within the 2 systems cannot be disentangled on the downstream side: the stakeholders buying this grain are the same (middleman, wholesalers, exporters), and they do not handle grain separately depending on their origin.
- Even for some oil millers practicing both exports and local oil milling base their choice on the compliance to international food safety standards (the grain failing to meet IFSS are locally processed into oil) but the production systems do not matter.

FRAMING QUESTION 1: WHAT IS THE CONTRIBUTION OF THE VC TO ECONOMIC GROWTH?		INDICATORS	RESULTS
CQ1.1	How profitable and sustainable are the VC activities for the entities involved?	**Operating Accounts of every type of actor**	See tables 2.1, 2.2, and 2.3
		Net operating profit (in US$ 1,000) by type of actor	
		Farmer in riverine system	5 752
		Farmer in rain-fed system	3 156
		Middleman	757
		Wholesaler	905
		Exporter	1 979
		Camel oil miller	431
		Small-medium oil miller	1 432
		Som Seed Agri oil miller	134
		Retailer of sesame grain	1 839
		Retailer of sesame oil	1 688
		Return on turnover (operating profit/production)	
		Farmer in riverine system	11%
		Farmer in rain-fed system	24%
		Middleman	6%
		Wholesaler	8%
		Exporter	14%
		Camel oil miller	34%
		Small-medium oil miller	9%
		Som Seed Agri oil miller	26%
		Retailer of sesame grain	14%
		Retailer of sesame oil	11%
		Benchmarks for farmers' net income (minimum wage, livelihood needs, job opportunities…)	See table 4.1

TABLE 3-7: SUMMARY TABLE OF INDICATORS FOR THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH

FRAMING QUESTION 1: WHAT IS THE CONTRIBUTION OF THE VC TO ECONOMIC GROWTH?		INDICATORS	RESULTS
CQ1.2	What is the contribution of the VC to the GDP?	Value of final VC production (US$ 1,000)	52 620
		Total VA and components (US$ 1,000)	20 575
		Total VA in percentage of the GDP	0.3%
		Rate of integration into the Economy (total VA/VC production)	75.4%
CQ1.3	What is the contribution of the VC to the agriculture sector GDP?	VC agricultural actors' Value Added in percentage of the agriculture sector GDP	0.5%
CQ1.4	What is the contribution of the VC to the public finances?	Public Funds Balance	0.0%
CQ1.5	What is the contribution of the VC to the balance of trade?	VC exports (US$1,000)	14 875
		VC total imports	6 357.4
		Balance of trade of the VC	8 517.6

TABLE 3-8: SUMMARY TABLE OF INDICATORS FOR THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH (CONTINUED)

FRAMING QUESTION 1: WHAT IS THE CONTRIBUTION OF THE VC TO ECONOMIC GROWTH?		INDICATORS	RESULTS
CQ1.6	Is the VC viable in the international economy?	Nominal Protection Coefficient (NPC)	1.24
		Domestic Resource Cost Ratio (DRC)	0.49

TABLE 3-9: SUMMARY TABLE OF INDICATORS FOR THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH (CONTINUED)

4. ECONOMIC GROWTH INCLUSIVENESS

4.1 Participation in the value chain governance

Vulnerability in the sesame value chain can be understood in terms of sensitivity – the extent to which people and economies depend on sesame – and adaptive capacity – the ability of individuals and socioeconomic systems to anticipate, respond to, and adjust to changes, as well as to minimise, cope with, and recover from their consequences.

The logic of value chains is based on the functional specialisation of actors from production to distribution, with the overall efficiency relying on productivity gains linked to economies of scale, particularly in intermediary functions such as collection, wholesale, distribution, or processing. This concentration of volumes in the intermediate functions inherently gives these actors greater power in the governance of the value chain. The sustainability of the system therefore depends on governance mechanisms capable of reducing these asymmetries, to promote a more equitable distribution of income among the actors.

Smallholder sesame producers in Somalia represent one of the most vulnerable groups within the agricultural sector. Their access to key productive resources such as land and water is largely governed by customary law and traditional authorities, who allocate these resources according to long-standing cultural norms and clan-based systems. As a result, access to land is often insecure and unevenly distributed, particularly for women and vulnerable populations such as IDP. These (informal) institutional arrangements shape the structure of the sesame value chain and influence who can participate in production, trade, and decision-making processes.

Thus, while sesame producers provide essential labour and expertise, their influence over decisions on production, marketing, and policy is very limited. They are largely excluded from formal governance structures, confined to community-based leadership shaped by cultural norms, and participate mainly in horizontal networks without meaningful vertical representation. This situation of detachment from central power is exacerbated by internal conflicts and mobility difficulties in both directions: government bodies struggle to establish representation, while community representatives remain confined to their local territories. As for other actors of the value chain, an important exporter noted a weak connection with other enterprises which he explains with ineffective government structures.

Women play a central role in the sesame production system and are estimated to represent around 80% of the labour force involved in activities such as planting, weeding, harvesting, and post-harvest handling. Despite their significant contribution to production, women's participation in decision-making remains limited. Limited access to land ownership also restricts women's ability to obtain formal credit, agricultural extension services, and other financial resources, as land titles are commonly required as collateral. In many cases, they do not have autonomy over farm management decisions or control over the income generated from sesame sales, as these are often managed by male household members or clan authorities.

However, women's economic agency tends to increase when they participate in other segments of the sesame value chain beyond primary production. For example, some women engage as grain aggregators (often referred to as middle-women) who collect sesame from multiple farmers and sell it to traders or exporters. Others participate as small-scale retailers in local markets or operate small-scale oil milling businesses, to diversify income sources and improve economic resilience. These activities allow women to generate independent income streams and gain greater influence over household economic decisions.

These commercial activities are particularly important in contexts characterised by high climatic variability and market uncertainty. Climatic shocks such as droughts and irregular rainfall can severely affect sesame yields, while price volatility in regional and international markets can reduce farmers' income stability. By

participating in different segments of the sesame value chain, women, and small producers in general, can better cope with these uncertainties, spreading risk across multiple income-generating activities.

Local cooperatives and producer groups allow more equitable participation, enhance bargaining power, and provide access to training and microcredit.

Seasonal cycles exacerbate income instability, deepening poverty, food insecurity, and limited access to healthcare and education. Addressing these issues requires enforcing labour legislation, modernizing farming practices, investing in rural infrastructure, strengthening cooperatives, and providing social safety nets. Such measures are essential for improving livelihoods, reducing exploitation, and supporting food security and sustainable rural development.

4.2 Income and employment

Income and employment are key indicators of economic performance and social impact. Jobs creation along the sesame VC strongly from one type of actor to another. The number of actors working in the VC is derived from the ratio of initial volumes and the size operation or volume annually handled by each type of actor. Hence, the model estimates a total number of 91,978 actors. The farmers represent 98.6% of the total actors. Around 68,000 farmers are operating in the riverine system and 22, 700 farmers in the rain-fed system. These numbers are of course below the estimates from the literature where 150,000 to 250,000 farmers are involved in sesame production, the majority of them owning 1-2.5 ha of land (SCALA, 2024). On the basis of a limited sample size of farmers, it is not easy to replicate these figures from the literature. However, with statistics on land allocated to sesame, it is easy to adjust the size of operation. The estimated number of middle-men (including middle-women) is 41 while there are only 3 exporters and 5 wholesalers. The number of small and medium oil millers is 252, representing only 0.3%. The numbers of retailers of grain (520) and oil (440) are relatively high, as in Figure 4.1.

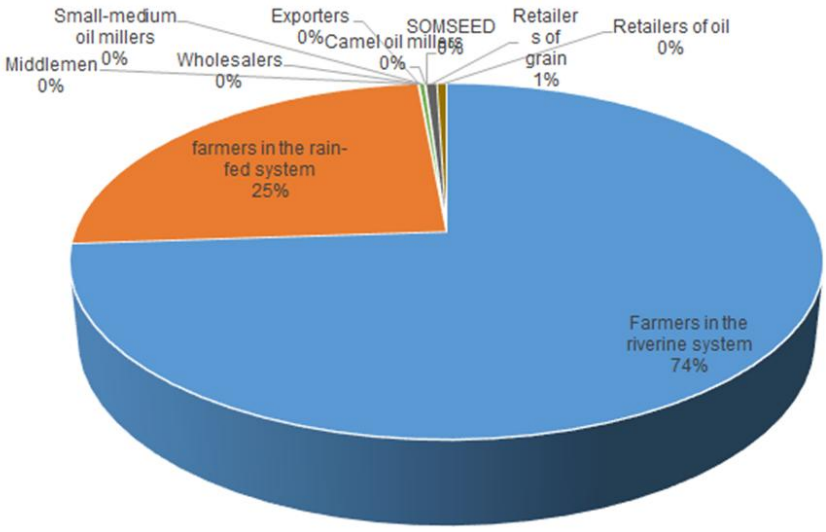

FIGURE 4.1: NUMBERS OF DIRECT STAKEHOLDERS ALONG THE SESAME VALUE CHAIN
Source: Authors

Along with these direct stakeholders operating in the sesame VC, there are also employments created. As seen previously, employment is concentrated in the oil milling sub-sector (camel oil millers, small and medium oil millers as well as Som Seed Agri). For Som Seed Agri even though it is alone, it is employing 2 permanent

workers while traders (wholesalers and retailers) are employment temporary workers in the form of services rendered.

Till now, Somalia does not have a nationally mandated statutory minimum wage law that is widely enforced across all sectors. Salaries are often negotiated based on the candidate's qualifications and experience. Minimum wage levels are often determined by individual employers, industry standards, or collective bargaining agreements in specific sectors or organisations[1].

Table 4-1 displays some salaries taken from an illustrative range based on the recent data that can be considered as reference wages.

TYPES OF EMPLOYMENT	SALARIES OF REFERENCE		
	US$/day	US$/month	US$/year
Permanent skilled Female	10-25	320-740	3,840-8,880
Permanent skilled Male	10-25	320-740	3,840-8,880
Permanent unskilled Female	7-18	210-520	2,520-6,240
Permanent unskilled Male	7-18	210-520	2,520-6,240
Temporary Female	5	-	-
Temporary Male	5	-	-

TABLE 4-1: SALARIES OF REFERENCE WITHIN THE SOMALI LABOUR MARKET
Source: Adapted from *https://rivermate.com/guides/somalia/salary*

The distribution of income in the form of net operating profit displays huge inequalities across the agents involved. Temporary agricultural workers are among the lowest-paid labourers in the country, earning daily wages that are often insufficient to cover basic needs, including food, shelter, and healthcare. They are typically employed under informal agreements, with no guaranteed working hours, irregular pay, and seasonal contracts that leave them vulnerable to income insecurity.

These workers are further disadvantaged by weak labour protections, including the absence of formal worker organisations, no access to social security, and few opportunities for collective bargaining or advocacy.

Gender inequalities further exacerbate their vulnerability, as women are often channelled into lower-paid, labour-intensive tasks such as weeding, harvesting, and post-harvest handling, with little control over earnings or decision-making. In addition, temporary workers frequently lack access to credit, training, and extension services, which limits their ability to improve productivity or diversify income sources. Exposure to market volatility, climatic shocks, and migration pressures compounds their precarious situation, making them highly sensitive to economic and environmental risks. Overall, temporary agricultural labour in Somalia reflects a broader pattern of structural marginalisation, where low wages, informality, and social inequalities intersect to perpetuate poverty and limit social and economic mobility.

Findings from the economic analysis indicate that 39.63 of the agents share only 17.33% of the total NOP from VC, while 98.93% of the agents only share 48.90% meaning that the remaining 1.07% share more than 50% of the total NOP. This led to a Gini coefficient of the value chain valued at 0.56. This coefficient is far from 0, and the corresponding Lorenz curve is far from the fair distribution line suggesting huge inequalities across the sesame VC.

Both net operating profit (NOP) for direct stakeholders within the sesame VC and wages paid at the benefit of the national economy account for US$ 19,057 million representing 92% of the direct VAD. Figure 4.2 displays the repartition of income (both wages and NOP) within the economy. Wages paid only represent 5% of the total income attributed to the sesame VC.

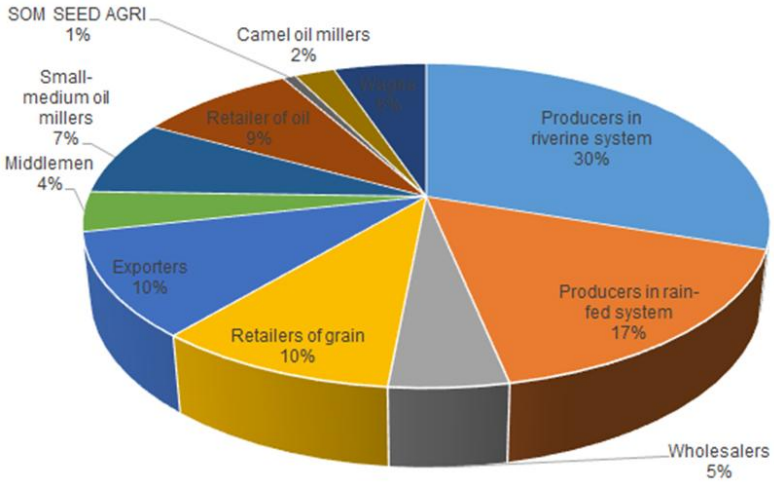

FIGURE 4.2: REPARTITION OF THE TOTAL INCOME ACROSS DIRECT STAKEHOLDERS AND EMPLOYEES
Source: Authors

Job and activity creation is a key factor in analysing the performance of a value chain, as it is one of the main drivers of economic and social impact.

Jobs creation along the sesame VC are investigated by dividing the wages paid by each type of VC stakeholder by the salaries of reference. As already seen previously, the wages are concentrated in the oil milling operations. The skilled permanent[2] workers hired by oil millers are men. Findings from job creation analysis indicate that by computing the time equivalent per category of jobs, only temporally jobs are created and concentrated in the milling operations. Over the 197 034 temporary jobs created within the sesame VC, 181 799 (92.26%) are found in the small and medium oil millers, 14 068 (7.14%) are created by camel oil millers while Som Seed Agri accounts for only 0.6%.

FRAMING QUESTION 2: IS THIS ECONOMIC GROWTH INCLUSIVE?		INDICATORS	RESULTS
CQ2.1	How is income distributed across actors of the VC?	**Disaggregated Value Added**	
		Producer in riverine system	26%
		Producer in rain-fed system	16%
		Wholesaler	6%
		Retailer of grain	10%
		Exporter	11%
		Middleman	4%
		Small and medium oil miller	14%
		Retailer of oil	8%
		Som Seed Agri	1%
		Camel oil miller	3%

		Total farm income (US$ 8.91 million)	46.74% of the total income within the VC
		Total wages and salaries	US$ 985 000
		Total income accruing to marginalised and vulnerable groups	
CQ2.2	What is the impact of the governance systems on income distribution?	**Income distribution among actors** **Producers (US$ 8.91 million)** **Oil millers (US$ 2.98 million)** **Traders (US$ 7.17 million)**	 46.74% 15.65% 37.61%
		Share of farm gate price in the final price (%)	68.96% (wrt to domestic consumer price) 57.14% (wrt to export price)
CQ2.3	How is employment distributed across the VC?	**Number of jobs (family, self- and formal employment) at different VC stages (permanent/ temporary, skilled/unskilled…)**	All the jobs created are temporary and fully concentrated in oil milling operations: 197 034 allocated to small-medium (92.26%), camel oil millers (7.14%) and Som Seed Agri (0.6%)
		Employment of women	

[1] https://rivermate.com/guides/somalia/salary

[2] They are not really permanent given that some oil millers such as Som Seed Agri are not working yearly-round but instead only 6 months per year.

5. VALUE CHAIN SOCIALLY SUSTAINABILITY

Value chains may improve knowledge, working conditions, wages, and broader social well-being, as well as distribute value with equity, favouring the most vulnerable people, leading to poverty reduction, smallholder empowerment, increased equality for women and youth, and overall social development. Yet, there is also the risk that VCs amplify existing inequalities, by rewarding actors that already have power, capital and technology, while keeping those at the bottom in vulnerable positions.

The VCA4D methodology regarding social sustainability focuses on assessing actual and potential impacts of the VC operations in six domains of development: Working Conditions, Land and Water Rights, Gender Equality, Food and Nutrition Security, Social Capital, and Living Conditions.

5.1 Working conditions

5.1.1 Respect to Labour Rights

General

The VCA4D methodology adopts the internationally recognised definitions of ILO regarding labour rights (including formal and informal contracts and agreements), child labour, job safety, and aims at assessing attractiveness in terms of level of wages compared to national standards, and of youth insertion in VCs' labour opportunities.

In 1990, ICESCR, ICCPR, and the eight fundamental ILO international labour conventions were signed by the FGS. According to ILO (n.d.), Somalia has not yet ratified several of the ILO fundamental conventions on freedom of association and collective bargaining (C87, C98), equal remuneration (C100), or minimum wage (C138), though it has ratified C182 and older instruments. Nevertheless, the FGS has recently defined with ILO the Decent Work Country Programme (DWCP) for Somalia 2023-2025 that serves two main objectives: to promote decent work and to organise ILO knowledge, instruments, advocacy and cooperation at the service of tripartite constituents (Government, employers' organisations, and labour organisations) to advance the Decent Work Agenda (ILO, 2024).

Agriculture is the backbone of Somalia's economy, employing more than 80% of the population and contributing substantially to national GDP and exports (FAO, 2011). Nevertheless, agriculture workers in Somalia are amongst the lowest paid in the economy. Studies and market studies confirm that rural are USD 3-5 per day a level insufficient to meet basic needs (Mohamud *et al.,* 2025). The study also investigated the impact of low payment wages on agriculture workers in Afgoye. The wages were considered insufficient to meet basic household needs. Contributing factors include weak or absent agriculture labour laws, outdated farming tools, inadequate infrastructure, lack of unionisation, and entrenched socio-cultural norms. These structural challenges lead to persistent poverty, food insecurity, malnutrition and limited access to essential services such as health care and education. Seasonal agriculture cycles exacerbate wages fluctuation, leaving workers without income during off-seasons and deepening household vulnerability. (Mohamud *et al.*, 2025).

Although Somalia has aligned with some of the ILO international standards, their practical enforcement is very limited, leaving agriculture workers vulnerable to exploitation and irregular working conditions. Informal employment is highly prevalent in Somalia, with most workers engaged in precarious jobs lacking stability or social protection. As above referred in the economic analysis, Somalia does not currently have a legally mandated national minimum wage across all workers and sectors. Instead, wages in most of the country are determined by individual employers, market conditions, or industry norms, where they exist due to external enforcement.

In Somalia, a child is legally defined as anyone under 15 years of age. According to the *Findings on the Worst Forms of Child Labour* for Somalia, children (age 5–14) are engaged in agriculture, including farming, harvesting, cleaning and packing crops (USDOL, 2023). While international conventions on child labour exist, Somalia's limited legal infrastructure prevents effective enforcement, leaving children at risk of exploitation with very low or no wages.

Respect to labour rights in the sesame production

Sesame cultivation is largely manual and involves labour-intensive tasks such as planting, weeding, harvesting, and post-harvest processing. Labour rights risks are particularly pronounced in rural agricultural activities, where sesame farming is common, and it is exacerbated when it involves women, youth, and other vulnerable (displaced) populations.

Since sesame is mostly produced by smallholder farmers, production relies primarily on family and seasonal labour, with periods of intense demand, requiring substantial human effort. (DWVP, 2024).

The workers are recruited on a casual/wage basis based on oral agreements. Farmers from Afgoye, referred that *those willing to work, gather under a tree in the village. The wages differ based on the tools used. For instance, if the casual labourer has his own hand tools it is way more expensive than when he/she has none. There is usually a daily rate or piecework* (Afgoye, FGD with farmers).

Workers may be paid daily, by the task, or in kind (e.g., food or subsistence goods or a share of the sesame harvested). Regular pay schedules or employment protections are often absent. Many agricultural workers have limited bargaining power, and wages may be irregular or below subsistence levels, with little regulation of working hours. During the second mission, a young (male) farmer, reported that *during planting and harvesting, we work from early morning until sunset. There is no fixed time because the water schedule controls everything* (Afgoye, FGD with youth).

Respect to Labour Rights in the sesame processing industries (oil-milling)

Employees of an oil mill (T2) interviewed in Afgoye, reported joining sesame milling work primarily due to limited employment opportunities, steady income, and proximity to the milling centres. Many joined between 2015 and 2024, as sesame milling has expanded due to market demand. Wages in the milling industry are usually fixed on a daily or weekly basis. They are determined by the mill owners with minimal negotiation. There are no collective bargaining structures. The working conditions are set by the mill owner. Employees work long hours (8-10 hours), often without formal leave agreements – sick leave and maternity arrangements depend on goodwill from employers. Decisions about working conditions are solely made by the mill management. Workers are rarely consulted. Safety measures are limited and mostly informal.

No formal workers' unions exist. Some employees belong to informal worker groups but these lack formal authority. These informal groups help sharing information and mediate small conflicts but do not influence wages or policies. Access to information on fair wages is low; workers rely mostly on word of mouth and NGO sensitisation whenever available. There is no formal social security. Communicating grievances to management is considered difficult due to fear of job loss and lack of formal channels. Workers seldom participate in decisions affecting working conditions or enterprise development.

Furthermore, traditional milling structures (camel mill) are considered labour-intensive, physically demanding and unstable, as noted by a traditional oil miller from Banadir, near Mogadishu: *The work is hard, and when sesame is not available, the mill stays idle*

5.1.2 Child labour

Child labour (12-15 years old) is a significant concern within the sesame sector. Child labour in sesame farming is primarily observed during harvest periods, affecting school attendance**.** In Jowhar farms it is widespread, primarily driven by poverty, displacement from recent floods and clan conflicts, and weak enforcement of labour laws (Jowhar, KII with SWDC staff). This pattern is consistent both in rain-fed and irrigated areas. While respondents mainly cited harvest-related labour as the reason for hiring children, other contributing factors include household economic pressure, cultural expectations for children to assist in farming, and limited access to childcare or after-school support during peak labour periods.

Child labour is mostly found in hard-to-reach areas. In an interview – conducted during the first mission – with the Somali Women Development Centre (SWDC), in Jowhar, it is acknowledged that *child labour in Jowhar farms is widespread, primarily driven by poverty, displacement from recent floods, clan conflicts, and weak enforcement of labour laws*. The interviewee reported school dropout and denial of education as children are often kept out of school to work on farms. Barriers to school attendance include poverty, long distances to schools, and nomadic lifestyles. Social norms also accept child labour on farms (Jowhar, KII with SWDC staff).

It has also been reported that there are children being exposed to heat (dehydration), sharp tools, pesticides, and long working hours that can cause injuries and health issues. *Climate shocks and displacement in sesame-growing areas increase vulnerability to child labour, and lack of birth registration makes age verification and legal enforcement difficult. Additionally, gender-specific risks, such as exploitation of girls in domestic work, should be addressed* (Jowhar, KII with SWDC staff).

Consistent child labour in oil milling has not been reported, though informal labour occasionally occurs, particularly in transporting and loading the. (Afgoye, FGD with oil milling employees).

5.1.3 Job Safety

Job safety in sesame production presents additional risks. Workers face potential harm at multiple stages of the production process, largely due to inadequate access to protective equipment. In irrigated areas, youth referred to the risk of waterborne diseases – linked to standing in irrigation water –, and to the prolonged exposure to high temperatures (Afgoye, FGD with youth). Threshing can expose individuals to insect and even snake bites; the use of hand tools carries inherent injury risks. Heavy lifting and transportation, often reliant on donkey carts, introduce further safety hazards. These occupational risks underscore the lack of formal occupational health and safety standards within the sector.

Safety risks are also linked to the use of agrochemicals, which are applied more frequently in irrigated areas where *modern* agricultural practices are more common than in Bay Region. However, it is important to note that during the first mission the Somali team witnessed the misuse of these products – showing lack of knowledge due to lack of specific training programmes and weak regulatory structures.

All these risks also apply to child labour (Baidoa, Afgoye, Jowhar, FGD with farmers).

Job safety in milling industries. In the milling industry, the reported injuries are mainly associated with electric milling operations, particularly contact with moving rubber chains that can cause physical harm. Dust inhalation and noise exposure were also reported. Preventive measures are limited and include **basic protective equipment, which is rarely available**, especially in small-scale milling facilities. As one worker in an oil mill in Jowhar noted, w*e lift heavy bags all day, and sometimes people get injured. The machines are fast, and if you are not careful, accidents can happen.* Another worker highlighted dust exposure, stating *when the milling is ongoing, there is a lot of dust. We usually cover our noses with cloth because proper masks are not provided.* A third worker emphasised the lack of protective equipment: *we know gloves and ear protection are important, but most of the time we work without them because they are not available.* (Jowhar, FGD with oil milling employees). The ILO has conducted training and assessments that revealed widespread non-compliance of its conventions in Somalia industries (ILO, 2025).

5.1.4 Attractiveness

As referred above, in Somalia, agricultural wage labourers constitute one of the most vulnerable labour groups. *Of the estimated one billion people working in agriculture, about 450 million are wage labourers, often earning substantially less than industrial workers while facing informality, poor working conditions, and limited protections* (Hurst *et al.*, 2007; ILO, 2021, quoted by Mohamud*, et al.* 2025). From the farmers' perspective, higher wages risk reducing the attractiveness of sesame production because productivity and mechanisation remain limited. Sesame becomes more attractive only when wage increases are accompanied by improved training and greater efficiency that translate into higher yields.

Young people participate in sesame production across the production cycle (land preparation, planting, weeding, irrigation management, harvesting, drying, threshing, and packaging), but according to their own assessment, employment remains insecure and highly exposed to climate-induced workload pressure, particularly during flood recovery and peak irrigation periods (Afgoye, FGD with youth). Other deterring factors, include low wages, variable working hours – which increase significantly during planting and harvesting seasons – informal agreements, lack of job safety measures, or social protection. During off-season months, work availability is limited, forcing many youths to seek casual labour in other crops or non-farm activities. Job stability is therefore low.

As access to water for irrigation is concerned, youngsters face challenges related to control of irrigation gates, often dominated by powerful farmers or elders; high fuel costs for water pumps; damage to canals and fields due to flooding; water scarcity during dry spells. Land and water disputes linked to clan dynamics, canal management, and flood-induced boundary shifts have occasionally disrupted youth participation, particularly for renters and sharecroppers (Afgoye, FGD with youth).

Despite these risks, youth perceive sesame as a valuable cash crop, especially when irrigation is functional and markets are accessible. Youth involved in sesame farming, generally report better food access than peers fully dependent on casual labour, though this advantage is fragile under climate shocks (Afgoye, FGD with youth).

Youth recognise the entrepreneurial potential of sesame due to its proved profitability; however, it is widely perceived as capital-intensive. Low rates of secondary school attendance further limit young people's options, as does insecurity in land tenure – particularly for those without strong clan support or for internally displaced youth. High youth unemployment is driving many young people to migrate to urban areas, with some failing to be integrated, therefore becoming IDP.

5.2 Land and water rights

5.2.1 Equity and security of land and water tenure

The status of land governance and tenure security in Somalia is defined by legal pluralism; whereby multiple legal orders coexist. Land and property relations are governed by three different sets of legal regimes: (i) formal systems of the state enacted in legislation law; (ii) customary law (*Xeer*); and (iii) *Shari'a*/Islamic law. However, in much of rural Somalia, land is governed by customary clan-based law customary law. Under *Xeer*, the notion of *deegaan* (home territory) is very important: it defines belonging and identity, and shapes who has access or use rights to land.

The civil war and complex political dynamics of the past thirty years have impacted current land tenure conflicts. Traditional and religious frameworks of land tenure tend to prevail when the formal institutions and their mechanisms fail. Yet, their effectiveness is weakened by the power imbalance borne of these internal conflicts. (Somalia Stability Fund, 2021). Though the system provides social recognition and conflict mediation through elders, it also creates limitations, including restricted land markets, uncertainty over long-term investment, and barriers for women, youth, and displaced populations. Overall, communal/clan land systems facilitate access for recognised members but offer limited tenure security and weak legal protection, particularly in areas affected by displacement, drought, and insecurity.

Land can be acquired by individual clearing, inheritance, request from the village council, by purchase or by gift. Such transactions are not purely private matters and often require the consent of community elders, especially if the transferee comes from outside the community (IGAD, 2015).

Pastoralist communities sedentarisation is slowly increasing in Somalia, especially in regions affected by drought. The *Xeer* law plays a key role in governing relations between clans. It addresses aspects of land

management – with a focus on pastoral land use – and it considers land for cattle grazing as a collective clan asset, though clans allow other clans to graze on the land in times of need. It prohibits building enclosures or permanent settlements on pastureland.

In the last thirty years, large scale population movements and resettlements have had impact on land use, which in turn impacts the livelihood of both pastoralists and farmers. Due to water availability, internally displaced people are more concentrated in irrigated areas than in rain-fed areas, as these zones tend to attract displaced populations.

Recent reports show that the quality of the soil in the country has been deteriorating because of intensive use and rampant mismanagement over many years. This is more apparent in the Southern areas (Lower and Middle Shabelle) where due to irrigation availability land is overused. Land degradation (understood as a reduction in the capacity of the land to perform the functions and services of a healthy eco-system) has accelerated since the collapse of central government, due mainly to the lack of good land use management and practice. The resultant poor land quality has compromised crop and livestock production, contributing to perpetual food insecurity, low incomes and widespread poverty (FAO and SWALIM, n.d.).

Land rights – sesame production

Pastoral land use is a significant issue in sesame-growing areas of Somalia, as agriculture – particularly sesame cultivation – and livestock grazing often compete for the same land and water resources. Pastoralists typically rely on traditional communal grazing rights, whereas farmers may assert claims over land for permanent cultivation. In riverine areas, forms of agropastoralism are practiced; however, an increasingly commercial agricultural paradigm tends to formalise and redefine land property rights.

Pastoralist and agro-pastoralist communities have distinct characteristics in terms of land tenure systems and land-related conflicts. Pastoralist communities relate to land in a different way from farmers, which can be a cause of conflict. *Where farmers' exercise of property rights over land entails ownership of the physical solus, pastoralists' claims are focused on access to resources on land that support livestock production* (Somalia Stability Fund, 2021).

In Bay Region and much of South-Central Somalia access to land under communal or clan-based tenure systems operates through customary norms rather than formal land titles. Farmers own small lands, 0.5–2 hectares. In an FG, the participants confirmed the availability of land, however, due to limited access to machinery and other essential resources, they decided to restrict the sesame cultivation to 0.5 and 2 hectares, due to their limited social and economic capacity (Baidoa, FGD with farmers).

In irrigated areas, medium and large farmers own or lease river-fed farms. In a focus group discussion with farmers from Afgoye, the land owned by the participants was referred as private, rented, and clan based. This land is generally more valuable than rain-fed land, because it can support multiple sesame cropping cycles, higher yields, and more lucrative crops (e.g., fruits, vegetables, or other cash crops), yet soil is more degraded.

This increased land value often leads to more intense competition for land access and ownership, making clear and enforceable land rights critical. Moreover, the rise in land value has resulted in 10 to 20% of poor and very poor households being landless and dependent on rented land. The middle and better-off households in the riverine areas tend to own land plots with an average of 2-4ha and 5-10ha, respectively (FAO and FSNAU, 2013).

Land grabbing is more frequent in riverine areas where land itself has a higher value, widening the gap between poor rural farmers and the local elites.

5.2.2 Respect for water rights

In terms of water management, the lack of water reservoirs to mitigate the impact of droughts makes the farmers vulnerable to the effects of extreme weather changes (FAO and UNDP, 2024).

The FGS has put together a National Water Resources Strategy (NWRS) 2021-2025.

The NWRS has three strategic goals: build a functional water sector governance framework; operationalise Integrated Water Resources Management (IWRM); improve priority water services (both resource management and deliver).

A Road Map was developed by MoEWR to implement the NWRS, including key activities like finalizing a national Water Act, developing institutional frameworks, and clarifying roles for federal, state, and local governments (MoEWR, 2021). In this report, the access to the access to water is seen as an entry point to wider peace building as well as a key steppingstone for socio-economic development. The NWRS is thought to provide a blueprint for integrating customary systems with modern governance (policy, law, institutions).

As in the case of land, water rights are largely managed through *xeer* – namely, in resolving water-sharing disputes and water rights during drought. This informal system offers flexibility but also results in inconsistencies in the application of water rights. Local water management committees (WMC), and traditional elders (VDC) are very important for managing water, especially for shared resources like *berkads* (rainwater reservoirs). Development agencies and international organisations like FAO, UNICEF, United Nations Development Programme (UNDP) – have developed programmes on water security, storage, and governance.

According to participants in a focus group in Bay Region, there is no formal irrigation; there are shallow wells only. The farmers retain water in terracing, soil bunds and they refer the need for *zaï* pits training[3] (Baidoa, FGD with farmers).

In irrigated areas, most of the cultivated land is watered through gravity irrigation and to a lesser extent pump irrigation, predominantly in Afgoye district. The government has installed irrigation infrastructures (pumps) in the Southern Shabelle region (EUD programme). Even in these riverine regions, in 2022, during the *Gu* season (main rainfall season), the water resources dried up and in Juba and Shabelle rivers water levels were below historic minimum levels (FAO and UNDP, 2024).

Farmers from Afgoye referred to use of irrigation through pumps drawing water from the Shabelle river; yet they complain about interruptions during dry spells (Afgoye, FGD with farmers). They consider irrigation via Shabelle canals reliable but affected by breakdowns and flooding.

Both in irrigated and rain-fed regions women are excluded as key actors in land and water access. Land and water disputes – linked to clan dynamics, canal management, and flood-induced boundary shifts – have also disrupted both youth and other vulnerable communities' participation, particularly for renters and sharecroppers.

5.2.3 VGGT compliant Large-Scale Land Acquisition

The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests (VGGT) offers international guidance for governments, communities and other stakeholders. Under the leadership of FAO and endorsed by the Committee on World Food Security (CFS), it provides resources for responsible

[3] *Zaï* pits are small planting holes dug into degraded or arid soil to capture rainwater, concentrate nutrients, and improve crop yields. Farmers often fill them with compost or manure before planting seeds.

governance of land, fisheries, and forests, including conflict resolution frameworks. Somalia can draw on technical and institutional support from the AU and IGAD, including strategies, capacity-building, and dispute resolution mechanisms, to implement the VGGT, strengthen land governance, and address land-based conflicts in pastoral and post-conflict contexts.

While Somalia participates in IGAD and AU initiatives supporting the VGGT, full implementation of the guidelines and related land governance frameworks has not yet been achieved, with key policies, post-conflict land administration, and dispute resolution mechanisms still under development.

Currently, Somalia's institutions provide uneven and insufficient protection of legitimate tenure rights and limited access to justice, especially in value-chain-related land and resource disputes. While some information may be sporadically available through local leaders, NGO, or civil society organisations, systematic, transparent, and rights-based information sharing related to LSLAs in the sesame VC is largely lacking. As a result, farmers' ability to engage meaningfully in decision-making or protect their tenure rights remains limited.

While Somalia's sesame production involves some commercial expansion and land purchase by larger actors, there is no clear evidence from major land deal databases or systematic LSLA records showing formal large-scale land acquisition projects specifically for sesame. Instead, most land use shifts occur through informal markets, medium-scale purchases, or customary arrangements rather than formal LSLAs as defined in global monitoring frameworks. LSLA being rare, tenant farmers experience insecurity because the rental conditions keep changing.

5.3 Gender equality

General

The 1979 Constitution of the Somali Democratic Republic outlines social and cultural rights including gender equality. Article 6 – Equality of Citizens – *All citizens regardless of sex, religion, origin and language shall be entitled to equal rights and duties before the law*. However, these principles have been undermined by 30 years of civil war. According to FAO, the civil war has deprived women of a central government that could protect their rights (FAO, 2012).

There is a significant lack of data on Somali women in general, and particularly on women's participation in agriculture. This gap is compounded by limited awareness among women of their own rights. This situation, acknowledged by the MoAI, during an interview held during the first mission, reveals – and explains – insufficient gender-sensitive policies. *Challenges in enforcing women's rights laws and gender policies in rural areas include limited awareness among women about their rights and insufficient resources for enforcement.* (Mogadishu, KII).

Women and children are among the most affected segments of the population during climatic disasters**.** In Somalia, women and their children are at the centre of the displacement crisis (UN Women, 2023). Yet, UN Women, also stresses that *women have contributed significantly to peace building efforts in recent years, forging new public roles. New trends are also now visible in the political, social and economic domains*.

In 2024, the UN launched two *Local Action Plans on Women, Peace, and Security* aligned with Somalia's National Action Plan on UNSCR 1325, supporting seventeen women's peace networks to engage elders and religious leaders in promoting women's leadership, funded by the SJF and UN Peacebuilding Fund.

FIGURE 5.1: FGD WITH WOMEN MEMBERS OF BAY COOPERATIVE
Source: Authors

Education statistics reveal significant disparities by gender and by settlement type in Somalia. Nomadic women are the most disadvantaged, with 93.5% having received no formal education. This rate is substantially higher than among women in urban areas (65.5%) and rural areas (71.4%), highlighting deep inequalities linked to women's location and livelihood (SNBS, 2022). Women farmers interviewed during the first mission, as in Figure 5.1, considered school attendance good, but acknowledged that girls still face workload constraints. (Afgoye, FGD with farmers).

5.3.1. Economic activities (risks of women being excluded from certain segments of the VC)

Sesame production is primarily carried out by women, who make up approximately 70% of the sector's workforce. Yet, 70% of land for agriculture is owned by men (FAO and UNDP, 2024; SNBS 2022). This reveals a significant gender power imbalance in the sector.

In sesame production, men perform heavy machinery and lifting tasks, while women engage in lighter but more repetitive tasks such as sorting, cleaning and packaging. (Afgoye, FGD with women farmers).

As documented in studies on gender inclusion in other agricultural cash-crop value chains, women's participation in this crop is largely limited to providing labour rather than exercising economic autonomy.

Women are, nevertheless, considered important key players in small-scale trading of sesame grains at local level. Women traders may be considered trade-based micro-entrepreneurs or petty traders, selling goods originating from rural areas such as vegetables, cereals, firewood, and milk as well as imported items such as *bagaash*, chewing gum, cleaning detergents, and clothing. Most women-traders are the primary income earner for their families. Women sell small quantities of sesame grains, as in Figure 5.2; yet men dominate bulk sales.

FIGURE 5.2: WOMEN SELLING SESAME AT THE LOCAL MARKET IN BAIDOA DURING THE FIRST MISSION
Source: Authors

Some act as middlewomen buying the grains directly from farmers. This shift from sole sesame production to market mediation corresponds to their perception of the dependency and instability they might experience, as weighed with potential gains they might achieve. Engaging in these markets' operations may be perceived as a risk mitigation strategy and a way to increase these women's autonomy:

I became a middlewoman after starting as a sesame farmer myself. When I saw how low prices were at harvest time and how farmers were forced to sell quickly due to cash needs and lack of storage, I decided to market my own produce directly. Over time, other farmers, especially women, asked me to help them sell their sesame as well. Becoming a middlewoman helped me avoid distress sales, manage risk, and stay active in the market throughout the season. (Mogadishu, KII with middlewoman during the second mission).

This is also acknowledged by another woman engaged in oil-processing, especially within small-scale, community-based, and cooperative operations. According to her, women outnumber men in this sector. Similarly, as the previous statement by the Bay middlewoman interviewed, she mentioned that her engagement in oil processing is driven by her perception of sesame production economic instability combined with the need for increasing her own autonomy:

Over time, I realised that selling raw sesame seed alone does not bring much income but processing it into oil adds value – and gives me independence and income to support my family. Sesame oil also has strong demand locally – for cooking and traditional uses – and this encouraged me to start producing it myself.

Contrary to expectations, this relationship with entrepreneurship does not stem from this woman's level of formal education but results from peer-to-peer relationships occurring at village level, especially amongst women. She refers to her education background as follows:

I completed some basic literacy and numeracy classes. I did not have the opportunity to attend other studies because I needed to help my family with farming and household responsibilities. I learned about sesame farming from my parents and through practical experience in our village, and over the years, I gained new skills in processing by working with local women's groups. (Mogadishu, KII with oil-miller during the second mission).

The respect accorded to these women by their communities underscores the importance of entrepreneurship in sesame-producing areas. Nevertheless, despite having some control over their income, they face challenges

in accessing resources and participating in decision-making processes. Mobility restrictions, security risks when traveling between farms and markets, limited access to capital and credit and male-controlled trading networks are the main constraints of women participation at a larger scale.

Besides sesame growing, processing and marketing, women combine those sesame related activities with engaging in vegetable value chains, which afford them with higher and more stable income opportunities. Sesame provides higher income yet vegetables benefit women more due to the control they have over this crop income. *Women sell vegetables more often; sesame sales are controlled by men.* (Afgoye, FGD with women farmers).

Vegetables are typically produced on small plots close to homesteads or riverbanks and are harvested continuously in small quantities. Women are heavily involved in daily farm management, including watering, harvesting, sorting, and transporting vegetables to nearby markets. Because vegetables are perishable, low value per unit, and sold frequently, households tend to allow women to manage their sale. Women sell directly in local markets, roadside stalls, or through informal networks, retaining partial or full control over the income, which is commonly used for household food, children's needs, and small expenses.

By contrast, sesame is a seasonal cash crop with higher market value and bulk sales that take place only once or twice per season. Sesame is often cultivated on larger plots (compared to vegetables) and requires access to land ownership, irrigation infrastructure, storage facilities, and trader networks, all of which are male dominated. Men typically handle negotiations with brokers, wholesalers, and exporters, as these transactions involve large sums of money, transport logistics, and clan-based market relations.

5.3.2 Access to resources and services

Women in Somalia face significant obstacles in accessing and owning land. Access to land for women is significantly constrained, usually mediated through male relatives. Deep-rooted socio-cultural norms, clan-based land governance, weak formal institutions, and prolonged insecurity mean that land is predominantly registered in men's names, limiting women's ability to hold formal titles.

Women may sometimes secure informal land-use arrangements – often through economic partnerships with sons, particularly if unmarried – but rarely hold formal ownership. Small plots are occasionally allocated to widows or female-headed households (Mogadishu, KII with MoAI during the first mission).

These patterns reflect the interaction of multiple legal systems and socio-cultural norms that weaken women's agency and tenure security (FAO and UNDP, 2024). National data confirm these disparities: land owned by a single individual is predominantly owned by men, with the gender gap more pronounced for agricultural land than residential land. This gap is even wider among nomadic populations (SNBS, 2022).

As noted by a MoAI official, women's access to land remains legally disadvantaged in many regions due to entrenched patriarchal inheritance practices, although local norms vary (Mogadishu, KII with MoAi during the first mission).

Despite women's significant contributions to agricultural production, various factors, including cultural and societal norms, limited legal rights, and economic dependence, hinder their ability to participate in or independently decide on the use of resources such as agricultural inputs, training, extension services, and credit. *Women often access agricultural inputs, credit, and extension services through cooperative organisations or women-focused programmes, which help bridge gaps in resources.* (Mogadishu, KII with MoAI during the first mission).

One of the factors is land tenure. Weak land tenure has limited women access to extension services. This has negative implications on food security, rural poverty, and overall economic growth. (FAO and UNDP, 2024).

Other constraints that female farmers face include the lack of access to financial resources.

A survey by UN-WOMEN in Somalia in the regions that grow maize and sesame, such as Baidoa, Afgoye, Beletweyne, and Garowe found that women have relatively low participation in agriculture because of low investment in adaptation strategies, such as access to drought resistant improved seeds and water resources. Overall, this affects their ability to access financial services from lending institutions. This lack of access was mainly attributed to not qualifying for loan services. Also, due to tradition/socio-cultural norms, women were not allowed to take out loans. The female participants in the above-mentioned study, further highlighted lack of financial literacy as a major challenge they experience when accessing credit facilities, including the requirement by financial institutions that there must be a male guarantor. (FAO and UNDP, 2024).

Due to women lack security to access loans most rural women rely on informal borrowing from family or savings groups. There are few benefits from formal credit or government extension programmes targeted to women, due to lack of collateral and mobility barriers.

5.3.3. Women decision making

Despite the cases referred above, in which women entrepreneurship is apparent, most women involved in agricultural production, such as sesame, often lack control over that income, mainly managed by men. They are primarily concerned with generating household income, and their expenditure decisions are limited and primarily focused on securing the well-being of their families: by way of food and nutrition, children's education and, small savings (Afgoye, FGD with women farmers).

This lack of full autonomy is reported by women farmers from Afgoye participating in a focus group discussion, during the first mission. The women participants in this FGD, would like to have more significant roles in production and sales, and requested specialised training in agribusiness and sesame quality management (Afgoye, FGD with women farmers).

According to the same source from the MoAI: *Women's contributions in households and communities often go unrecognised, particularly in unpaid labour and decision-making roles. Women influence household food and small market decisions but have limited say in large-scale farming or land issues.*

This statement is confirmed by Women's Empowerment in Agriculture Index (WEAI):

Women primarily engage in crop production which many consider to be of low economic value, while men take part in livestock management, trading, marketing, and labour-intensive tasks such as land preparation, along with making decisions about production activities. (…) *Men take the lead on deciding how resources are utilised.*

5.3.4 Leadership and empowerment

While women are actively involved in household management and farming, leadership and decision-making positions within village committees are predominantly held by men. Women face additional barriers, including low confidence and a lack of knowledge and skills needed to engage effectively in discussions on production, sales, and income. To address the low participation of women in decision-making, women-focused farmers' cooperatives and associations have been established to encourage their participation in leadership roles.

Women participation in cooperatives

Women's participation in agricultural and livestock committees remains limited, but their representation in cooperatives and local councils is slowly increasing. *Hirshabelle has active women's groups and cooperatives that focus on agricultural production and marketing. These organisations aim to empower women, enhance their skills, and improve their economic opportunities in farming activities* (Mogadishu, KII with MoAI during the first mission).

Nevertheless, in Bay Region, women tend to be more active across the sesame value chain, with an estimated 20–30% holding leadership roles, including farmer group leadership, plot management, labour coordination, and participation in producer committees. (Baidoa, Focus group with Farmers). In Jowhar women's participation is considered less expressive: *Women participate, but leadership low (10–15%); women roles in processing and farmers' group administration* (Jowhar, Focus group with Farmers). In the FGD with women farmers in Afgoye they explicitly requested business and leadership training.

5.3.5 Hardship and division of labour

Women's workload in agriculture often overlaps with their domestic and caregiving responsibilities, leading to a dual burden that leaves them with little time and energy for either role. This struggle can result in decreased productivity in farming and increased stress. (MoAI representative interviewed first mission).

Also, women engaged in income-generating activities, see domestic responsibilities, especially childcare, as barriers to expand their economic activities.

Even in the rare cases in which there are labour saving technologies, these are not available to women. It is also notable that climate shocks and income pressure have worsened women workload (Afgoye, FGD with women farmers). Participants noted that targeted women's groups, access to small irrigation plots, labour-saving technologies, and gender-sensitive extension services would significantly improve equity.

5.4 Food and nutrition security

General

The VCA4D methodology adopts the internationally recognised definition of food security (also referred to as food and nutrition security) as proposed by FAO: *Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life* (1996 World Food Summit). From this definition, four subdomains of food security can be identified: food availability, access, utilisation and stability. For food security objectives to be realised, all four dimensions must be fulfilled simultaneously (FAO, 2008).

Somalia faces a chronic food crop deficit. According to a recent report from WB, *local production meets only 22% of* per capita *cereal needs. Even in the best agricultural seasons, domestic production provides only about 40–50% of* per capita *cereal needs* (WB, 2023).

In March 2025 (WFP, 2023), the WFP – Saving Lives, Changing Lives – quoted the Director of Food Security and Nutrition Analysis (FSNAU) who brought attention to the fact that *hunger is rising again as another drought looms. One million more people could be pushed into crisis levels of food insecurity in the coming months as drought conditions, conflict and high food prices threaten to disrupt farming* (World Food Programme, 2023).

Yet, according to recent data issued by the Integrated Food Nutrition Phase Classification (IPC), the situation of food insecurity in Somalia has slightly improved from 2023 to 2024. In comparison to the same period the previous year, in 2024, there is a 20% reduction in the number of food insecure population. *This is attributed to better rainfall over the past two seasons which have positively impacted livelihoods, and sustained humanitarian assistance* (IPC, 2024).

According to WB*, the root causes of this extreme food insecurity are to be found in the collapse of most irrigation and flood-control infrastructure, itself a consequence of the lingering civil conflict in many rural areas in Southern Somalia. Other contributing factors are poverty; gender inequity; high population growth; limited access to water, sanitation, and health services; and more frequent, severe, and protracted droughts* (WB, 2023).

As reported by the IPC report issued in 2024, humanitarian assistance to populations suffering from food insecurity in Somalia has played a critical role. However, IPC calls the attention for this support risking not to be secured in the next decade (IPC, 2024).

This report uses two indicators, food insecurity and acute malnutrition. The Bay Region is in a worse situation as compared to the riverine regions. In terms of food insecurity, Bay is classified as at a high food insecurity risk – *Crisis* (Phase 3). The riverine regions are considered *Stressed* (Phase 2)*.* In terms of acute malnutrition, both regions are classified as *Critical,* but the IPC refers *lack of evidence* for some of the areas of the Shabelle region.

5.4.1 Availability of food

Being a cash crop, sesame production, is not directly related to food availability in the market.

In Bay Region, the population mainly consume staple food, such as sorghum, maize, beans and legumes – which are produced locally or bought at the local markets. In the riverine regions, there is a more diverse offer of food produce, also related to co-production of fruits, particularly banana and vegetables. Producers of agricultural products, especially women, are often traders in *bazaars*. The greater isolation of rural areas and small communities from supply centres due to insecurity and infrastructure deterioration affect also food availability.

While food products may be present in markets, many households cannot afford to purchase them. There is an economic discrimination in what food purchase is concerned. This reflects socio-economic discrimination in access to food, as will be discussed below.

5.4.2 Accessibility to food

Sesame farming contributes to food security mainly through income generation. Most households sell sesame grain and use the income to purchase staple products such as maize, rice, sorghum, oil, and vegetables. Youth involved in sesame farming generally report better food access than peers fully dependent on casual labour, though this advantage is fragile under climate shocks (Afgoye, FGD with youth). It also creates jobs beyond farming, including processing, packaging, and trading, which provide household income.

Food availability is closely linked to food prices. When farmers are unable to produce enough food to meet local demand, shortages occur. As demand continues to rise while supply remains limited, food prices increase, making it more difficult for households to afford basic necessities.

The drought/floods, combined with broader political instability, has led to price volatility, rising unemployment, and high food and fuel prices**.** While humanitarian actors have played a key role in addressing this constraint among the most vulnerable through provision of assistance, they are equally faced by limited resources and disruptions in their operations due to extreme climatic conditions and conflict. IPC reported that while prices of staple foods – such as maize and sorghum – declined in December 2023 compared to the same period the previous year, the prices were still higher than the 2018 to 2022 five-year average (IPC, 2024).

5.4.3 Utilisation and nutrition adequacy

There is an evident connection between the food produced and the food consumed in these rural areas.

In rural Bay Region, sorghum remains the main staple crop and a central component of household diets, consumed as porridge or flatbread. Maize is also produced but less widely consumed. In riverine regions, many fruit crops are grown, mostly under irrigated conditions for domestic consumption, including, banana, lemon, watermelon, papaya, and grapefruit, among others.

In these two regions, households typically consume three meals per day, mainly based on sorghum, maize, or rice. During times of crisis, meal frequency is reduced to two or even one meal per day.

Common preparations include *soor* (staple Somali dish made from ground maize or sorghum cooked into a thick, dough-like consistency), *borash*, *canjeero* (traditional Somali flatbread), and porridges, sometimes combined with sesame oil. Recently, beans have been introduced into rural diets, depending on household income, alongside cowpeas that are either grown or purchased.

Camel is the most important source of red meat in these regions. Milk is used particularly for children and might be consumed daily, while goat and sheep meat is usually eaten only once a month. Poultry keeping is widespread among poor households, for both self-consumption and resale.

5.4.4 Nutrition Stability

These two regions, as most of Somalia, have suffered from great instability in what food supplies are concerned. The Bay Region has a long history of droughts, which have often turned into famines, causing widespread suffering. Most prominent among these crises was the 1991/92 famine, which was caused by a combination of drought and civil war in the early years of state collapse. The capital of Bay region, Baidoa, gained the nickname *the city of death* by international media (The Guardian, 2023) in the early 1990s due to the numbers of people who died there during the famine. Before, Bay and Bakool were considered Somalia's *breadbasket,* producing most of the country's sorghum and significant livestock.

Droughts have continued to hit the region since 1992, the famine in 2011 being a particularly devastating example. A decade later, according to FSNAU, Somalia has again experienced a large-scale drought.
That organisation has stressed that *If humanitarian food assistance is not scaled up and sustained, an estimated 4.1 million people across Somalia are expected to face Crisis (IPC Phase 3) or worse outcomes through June 2022, inclusive of a significant increase in the number of households facing Emergency (IPC Phase 4). Up to 3.7 million additional people are expected to be Stressed (IPC Phase 2), bringing the total number of people facing acute food insecurity to nearly 7.9 million, which is equivalent to roughly half of the total Somali population.*
Once again, Bay and Bakool regions are among the worst hit regions, with 188,220 people in Bay and 74,390 in Bakool classified as being in *crisis*.

In terms of nutrition, an estimated 1.7 million cases of children aged from 6 to 59 months face acute malnutrition between January and December 2024, including 430,000 who are likely to be severely malnourished (UNICEF, 2024). Overall, the analysis findings shows that high levels of acute malnutrition persist in many areas (IPC, 2024). Malnourished children are usually connected with high children mortality and morbidity rates.

Nutrition value accorded to sesame
There is moderate awareness among women of the sesame nutrition value**,** it is mainly seen as cash crop. (Afgoye, FGD with women).

Sesame is consumed in various forms, including as oil, traditional sweets such as *lows iyo sisin*, and beverages such as toasted sesame milk. In urban areas, particularly in Mogadishu, consumers tend to be more aware of the nutritional value of sesame and sesame butter (*tahini*) may be found.

5.5 Social capital

General

Social capital refers to networks, norms, and trust that enable individuals and communities to work together for mutual benefit.

FAO has clearly articulated the need to strengthen an *enabling environment* for governance, policies, programmes, and investments (Figure 5.3) as a fundamental condition for achieving rural food security. This includes supporting governments in delivering on their commitments while empowering communities to actively participate in decisions that affect their livelihoods. FAO also emphasises the inclusion of small-scale producers, civil society, and the private sector in policy formulation to ensure the effective implementation of National Agriculture Investment Plans (NAIP).

The idea of an *enabling environ*ment is behind FAO's capacity development programmes: a country reaches its development goals only by strengthening its individuals and organisations while creating an enabling policy environment.

FIGURE 5.3: FAO ENABLING ENVIRONMENT DIAGRAM
Source: FAO (2017)

In Somalia's rural areas, social capital functions more effectively at the community level, both economically and socio-culturally relations of trust that benefit communities' livelihoods, manifests primarily through *kinship, clan systems*, and *local associations*, rather than formal organisations or government structures.

NGO and INGO also play a recognised role as aggregators of actors; however, there is general agreement that their actions are irregular and largely project based.

There is no integrated *enabling environment* as defined above. In our view, this represents one of the major weaknesses of the agricultural system.

The concept of *citizenship* in Somalia remains weak, with most social and economic interactions occurring through informal networks. According to the *Somali Integrated Household Budget Survey 2022* (SIHBS, 2022), only 4.1% of the adult population (aged 15 and above) possesses a passport, which serves as the country's only nationally recognised form of identification. Consequently, the overwhelming majority (84.7%) of the Somali population does not own any form of identification.

5.5.1 Strengths of producer organisations

Farmer cooperatives

Historically, the socialist state of Somalia, during the consolidation of the regime in the late 1970s, the cooperative system had become a central pillar of state policy. According to Article 41 of the Constitution of Somali Democratic Republic, 1979 (Somali Democratic Republic, 1979),

The economy of the Somali Democratic Republic shall comprise the following sectors. The state sector which shall constitute the vanguard in the economic development of the country and shall be given special priority; The cooperative section which shall be instrumental in promoting the living standards of cooperative members, while promoting the rapid growth of the national economy, and the state shall participate in its planning and encouragement (Somali Democratic Republic Constitution, 1979). The cooperatives therefore came second, followed by the private sector, which *shall be based on non-exploitative private ownership*.

By the late 1980s, economic strain, conflict, and declining state capacity weakened the cooperative framework. Structural adjustment programmes encouraged market liberalisation, reduction of state control, and privatisation. This shift directly contradicted the centralised cooperative model, weakening state-led production systems and reducing political commitment to cooperatives. Nowadays, farmers' cooperatives are still important and quite widespread, but they are not very much active. Some are even named by the national informants as *ghost* cooperatives. Both are found in both regions. The most interesting ones are found in irrigated areas. They help with storage, market and consultation. All is informal. The cooperatives are registered by the MoAI (FGD with Bay cooperative as in Figure 5.4).

FIGURE 5.4: FGD WITH MEMBERS OF FARMERS' COOPERATIVE IN BAIDOA
Source: Authors

Cluster systems

Cluster systems are informal or semi-formal group marketing arrangements where sesame farmers located in the same village or production zone coordinate sales to improve bargaining power and reduce transaction costs. They are not always legally registered, as cooperatives, but function collectively during the marketing phase (Table 5-1). *One farmer cannot negotiate, but together we can talk to the buyer* (Afgoye, FGD with members of farmers' cooperative).

REGION	REGIONAL CHARACTERISTICS	BENEFITS REACHED BY COMMUNITY-BASED ORGANISATIONS	BENEFITS REACHED BY FARMERS COOPERATIVES	MESSAGE ADDRESSED TO GOVERNANCE STRUCTURES
Bay region	• There are almost no producer groups or they are very weak. • Farmers are not informed about the markets and they have no proper bargaining power. • The traditional institutions are still very important for the resolution of conflicts.	Village savings groups managed by women	Training, seed distribution, link to humanitarian programmes.	Support rain-fed farmers, fair pricing, drought programmes.
Jowhar	• Farmer groups and aggregation centres that exist are well organised. • The flow of market information is more effective through trader networks. • Trust is higher among the communities with irrigation committees that are functioning	River committees support to canal maintenance	Collective input purchase, water pump repairs, shared tractors. Cooperative negotiates bulk sales; shares price updates.	Repair irrigation canals, regulate traders, fund cooperatives
Afgoye		• Cooperative savings groups	• Bulk marketing, tractor hire, training, connections to Mogadishu buyers. • Shared pumps, irrigation management, input distribution	• Regulate fuel prices, improve irrigation, secure roads

TABLE 5-1: SUMMARY OF FGD (IN BAIDOA, AFGOYE AND JOWHAR) ON SOCIAL CAPITAL
Source: Authors

Farmers' organisations inclusiveness

Cooperatives' membership is very much based on the community structures. If you have access to land and to crops and something to supply (goods, income) you may be a member**.** Women are members if they fulfil these requirements. IDP people do not have access to land easily, so this is a constraint to be part of the cooperative. This may be mitigated if the newcomer belongs to the same host community (lineage). Local arrangements may be made in more cosmopolitan communities.

The way it is put by national informants:

In Jowhar several different people live together (i.e., local populations with Somali Bantu refugees). There is no inter-marriage. Some Somali do not accept them. Yet, when speaking about cooperatives they might be well integrated, since they (Bantu people) *are good farmers.*

Evidence-based research (Mayaux, 2022) highlights the critical role of state institutions – and, more importantly, of policies tailored to farmers' needs – in creating the conditions necessary for inclusive land and

water programmes. Such policies are essential not only for ensuring equitable access and participation, but also for scaling up successful initiatives at the local level in a sustainable and coordinated manner.

Cooperatives' representation and negotiation power in the sesame production regions

Farmers' associations, in the sesame production regions, play a supportive role within the sesame farming community, aiding smallholder farmers and facilitating access to mechanisation through tractors and hand tools.

According to FAO and UNDP Scaling up Climate Ambition on Land Use and Agriculture (SCALA) report, *farmers cooperatives still play a crucial role in bringing the smallholder farmers with common goals and interests together and offer them a platform to lobby, as well as gain prospects that they otherwise could not have individually, including negotiating for better markets, lobbying for subsidised prices on farm inputs and securing land rights. Notably, most smallholder farmers in Somalia cultivate more than one crop to mitigate risks of crop failure and diversify income. Subsequently, cooperatives handle a combination of various crops, including maize, sorghum, sesame, amongst others* (FAO and UNDP, 2024).

The most active cooperatives have representatives and their leaderships are accountable.

In some places, they can negotiate if there have connections with exporters or large-scale retailers/ brokers, if there is a good supply.

During the first mission, it was possible to observe the high organisational level of some farmers' cooperatives, with good administrative records, in some cases superior to those of the public institutions themselves.

In Afgoye, farmers receive several forms of collective support through cooperative and cluster arrangements, including shared irrigation pumps, coordinated irrigation management, and input distribution. These supports contribute to tangible benefits such as more reliable access to irrigation water, reduced individual production costs, increased cropping intensity, and improved household income and food security. (Afgoye, FGD with members of farmers' cooperative).

Distinguishing between supports and benefits helps clarify how collective action translates into livelihood outcomes. When speaking with these farmers, the perceived benefits are bulk negotiations with potential buyers, tractor hiring, training. (Afgoye, FGD with members of farmers' cooperative).

The cooperatives in Afgoye face some challenges: High fuel cost, pump theft, pests, price volatility. There was nevertheless dissatisfaction due to dominated trader pricing. The coop. informs the famers about price trends, buyer contacts, export demand.

5.5.2 Information and confidence

The negotiation power of farmers organisations depends on relations of trust that are built by their leader or someone influential in the cooperative. Yet, for most farmers there is very limited negotiation power even if they are well organised.

As referred above, farmers have limited bargaining power and little influence over agricultural policies. Their ability to negotiate prices largely depends on the strength of the informal networks they have managed to build. In many cases, production decisions are driven by external market demand rather than local priorities. Farmers may even be pressured by middlemen or brokers to cultivate specific crops.

At the same time, farmers operate with minimal state support or regulatory protection. There is little to no government oversight to ensure fair pricing, contract enforcement, or market transparency. The absence of agricultural extension services further constrains productivity and innovation, leaving farmers without technical guidance, access to improved inputs, or training in sustainable practices. As a result, they remain

highly vulnerable to market fluctuations and exploitation. Communication flows and benefit distribution are asymmetrical.

If we take other actors of the other segments of the value chain, it also depends on relations of trust built among them. The state does not appear to promote cooperative relationships among larger-scale producers and exporters. On the contrary, the absence of coordinated public intervention seems to create space for individualistic approaches, with limited collaboration or collective action. The state does not appear to promote cooperative relationships among larger-scale producers and exporters. On the contrary, the absence of coordinated public intervention seems to create space for individualistic approaches, with limited collaboration or collective action.

When asked if there were connections between his firms and other exporters, a KII replied Not really. Bad governance is pushing back the sector, we are talking not just about the farmers, but of the whole chain.

5.5.3 Social involvement

Community consultations and needs assessments are primarily driven by NGOs and their specific programmes, rather than by a coordinated public framework. The government limits itself to providing advice when prompted by an international organisation.

International NGOs primarily engage with community-based organisations (CBOs). These CBOs – together with cultural and religious leaders – serve as trusted intermediaries between external actors and local communities. Inserted into clan and kinship networks, they play a crucial role not only in facilitating communication and implementation at the grassroots level, but also in ensuring that traditional knowledge and practices are preserved and transmitted across generations. When there is an accident due to poor infrastructures, they join to find a solution. Irrigation structures are repaired by the community.

Clan and Kinship Networks
Clans are the primary social units in the sesame growing regions. They provide identity, security, and economic support to its members. High levels of trust exist within clans, but inter-clan trust can be fragile due to historical conflicts. Reciprocity is a key element: people rely on mutual aid during hardship, but this is mostly localised within kinship or clan boundaries. Extended families, within a clan, often share resources and assist each other during crises like drought or conflict. These networks act as informal governance mechanisms, mediating disputes and enforcing local norms.

Community-Based Organisations
As mentioned above, there are informal groups of village representatives, especially for pastoralist and farming communities. These groups facilitate collective action, such as water management, grazing land allocation, or collective marketing of crops.

Role of Religion
Islam plays a central role in shaping moral obligations and social norms. Religious networks often reinforce community solidarity and organise collective welfare (e.g., zakat distribution, building mosques or schools).

5.6. Living conditions

General

Somalia's last official census was conducted in 1974, estimating the population of 4,151,842 people with an average life expectancy of 44.3 years (SNBS, 2022). Since then, two subsequent censuses were carried out in 1979 and 1986, but their results were never released (SNBS, *idem*). In response to this long gap, the *Somalia Population and Housing Census* was launched in 2023 and is expected to be finalised by 2029, representing the

first comprehensive effort to produce reliable demographic data in nearly five decades (SNBS, *idem*). The previsions of WB for 2024 are 19 million (WB, n.d.).

Although the present study focuses on analysing the livelihood conditions of actors in the sesame value chain, it is important to recognise that sesame production takes place in regions affected by two concurrent phenomena: *nomadic* populations, previously nomadic populations who went into sedentarisation (agropastoralist livelihoods), and displaced populations dependent on humanitarian assistance who are seeking to integrate into the rural and urban economies of these regions. Many semi-nomadic pastoralists have gradually adopted crop farming, including sesame, as part of a process of sedentarisation, though many still maintain livestock herding alongside farming.

All the statistical reports relating to sesame production regions' livelihoods consider both the *nomadic* and *settled* segments of the population. The indicators related to *nomadic* populations consistently register the poorest outcomes across these livelihood categories.

The *Somali Integrated Household Budget Survey 2022* (SNBS, *idem*) implemented with the support of the WB Group – data collected at national-level – has shown that most of the Somalia's population live below the national poverty line. Also, that much vulnerability is uneven: nomadic populations had the highest poverty incidence.
A more recent approach, published in May 2025, that models' poverty rates at the district level, using the model of Fay III and Herriot (1979), was prepared by the Somalia National Bureau of Statistics (SNBS) with technical support from WB (2025). This study applies the area level model approach, Small Area Estimates (SAE) methodology, which allows to relate district level direct survey poverty rates to auxiliary variables (geospatial indicators) to estimate poverty rates in all districts within Somalia. All three regions – Bay, Middle Shabelle, and Lower Shabelle – fall within the *moderate-poverty* band.

5.6.1 Health services

The prolonged humanitarian crisis in Somalia has left the health system weakened, fragmented, and chronically underfunded, undermining its capacity to provide consistent and equitable care across the country.

Health is dominated by the private sector which has recently slightly improved mainly due to international investment. However, in 2022, public investment remained low with only 1.3% of government spending dedicated to the health sector. Due to the limited regulatory capacity of Somalia's health sector, there are currently no established quality standards or operational regulatory bodies overseeing healthcare services and pharmaceuticals. As a result, the private sector is largely unregulated, and providers can operate without any oversight and produce services and products of unknown quality. This limits the full potential of the private sector, as effective private sector investment requires functional regulations to be effective.

About half of rural residents (41.4%) and more than two thirds of nomadic residents (78.5%) report accessing health facilities located in the same district (FRS, 2022).

This information was confirmed by the Somali colleagues when referring to the sesame production areas, highlighting the severe gaps in rural healthcare access. Villagers often need to travel up to 50 kilometres to reach the nearest health centre, while primary health services at the village level are mostly provided by traditional healers and midwives.

During the rainy season, transportation becomes even more challenging, with donkey carts serving as the main mode of travel, and villagers relying on nearby vehicles only when available, often paying out-of-pocket for fuel. This underscores the limited accessibility and high cost of essential healthcare in these communities.

Most health centres are run by NGO. Being project-based, the end of the project may lead to the end of the support.

According to the national informants, during the COVID-19 pandemic, there was no vaccination provided in these rural areas due to being conflict-affected and insecure regions. The SNBS report (2022) refers that only 7.1% have received at least one COVID-19 vaccination dose. Also, that vaccination was more common among females, 5.9% have received at least two doses, compared to 3.9% of males. By place of residence, urban and rural residents register higher vaccination rates compared to nomadic residents (*idem*).

5.6.2 Housing

According to the SNBS report of 2022, the rural residents mostly have 1-2 rooms, 35.9% and 39.1%, respectively. Most nomadic people live in modest single-room structures (*idem*).

Three main types of housing can be observed, as in Figure 5.5. Higher-quality housing typically features solid wall structures made of mud or brick, combined with iron sheet roofing (left), providing greater durability and protection. Traditional hut-style housing typical of pastoral or rural communities (middle). The lowest-quality housing is found in IDP settlements, where shelters are often constructed with temporary materials and lack adequate structural strength (right). These shelters offer limited protection and are highly vulnerable to extreme heat and heavy rainfall.

FIGURE 5.5: THREE TYPES OF HOUSING STRUCTURE
Left: IOM camp. Centre: *Aqal* Somali. Right: Somali houses.
Source: IMO Somalia (left), photograph by Njau Kelvin (centre), photograph by Olaf Unverzart (right).

Access to quality water

Rural areas generally have poorer access to safe drinking water. National survey data show that rural households are significantly less likely to get drinking water from improved sources like piped water or protected boreholes, and many rely on unimproved surface water sources, especially in dry seasons.
In the Bay region, prolonged droughts have worsened water scarcity, forcing women and children to walk long distances for water. Groundwater – the main source – is limited, and seasonal rains are often insufficient to replenish traditional water stores. Rural populations drink from the ponds and shallow wells with no filtration. Humanitarian agencies have provided boreholes and WASH support to vulnerable communities, but gaps persist.

In riverine areas, water availability for agriculture and domestic use tends to be better, but infrastructure remains fragile and access to clean water infrastructure (such as piped systems) is still low for many rural households. Overall, vulnerability to drought, infrastructure deficits, and underfunded water services keep access to quality water below national and international targets.

Access to sanitary facilities

Most households rely on pit latrines, informal shared toilets, or unimproved facilities, with open defecation still practiced in these rural areas.

Bay region – humanitarian projects have provided emergency water and hygiene support to thousands of displaced people, but these remain *partial and temporary interventions* rather than permanent infrastructure.

In *Middle Shabelle* (*Jowhar*) – agencies in have recently built *gender-sensitive latrines*, *rehabilitated shallow wells*, distributed *hygiene kits* (soap, menstrual sanitation supplies), and supported water management training to improve local sanitation and hygiene access. These are typically funded through short-term humanitarian projects and focus on drought-affected and displaced populations, not broad rural coverage.

5.6.3 Education and training

In 2022, just over half of the population (53.7%) was considered *literate* (*idem*). To be considered *literate* generally means having basic reading, writing, and numeracy skills sufficient to manage everyday life and livelihood activities.

The *literacy* rate is higher among males than females, at 63.6% and 45.3%, respectively. There is a substantial difference in literacy rates between age groups, with younger age categories showing the highest literacy rates and the oldest members having the lowest literacy rates. Literacy rates are higher in urban and rural areas, at 60.9% and 49.1%, respectively, than in nomadic areas, 20.5% (*ibidem*).

The same report refers that nearly two-thirds (65.5%) of the Somali population have no formal education. The educational level most reported is *some primary education*, as this group represents 16.6% of the population. Only 4.6% of the population report having completed secondary education and 4% attained higher education. Young cohorts are the most educated ones. For individuals falling in the 20-24 and 25-29 age groups, higher education attainment rates are at 14.2% and 12.2%, respectively (*ibidem*).

In many rural areas, Koranic schools – often called *dugsi* or *madrasa* – serve as the primary (and sometimes only) form of education available.

Among nomadic populations, the overwhelming majority (92.5%) reported no formal education, while two-thirds (68.6%) of rural respondents have no formal education. Only 3% of rural residents have completed secondary schooling, and 1.7% have reached higher education.

The net attendance ratio (NAR) for primary school is a measure of the official primary school-age population (6 to 13 years) attending primary school. Only about a quarter of all primary school aged children in Somalia attend primary school. The NAR is not significantly different between rural and urban populations (over a quarter for both), however it is extremely low in the nomadic population at 5.2%. This means that a very high proportion of children in the nomadic communities do not attend primary school, especially when compared to children in urban and rural areas. The net attendance ratio (NAR) decreases to 14.6% for secondary school aged children. The NAR is significantly higher for secondary school aged children (*idem*).

The Shabelle Education Umbrella (SHEDU) is a major local NGO working to improve access, retention, and gender equity in education in Middle Shabelle. Education in Middle Shabelle is improving thanks to local institutions like SHEDU and some new school construction, but access remains fragile due to climate shocks, security, and gender gaps. In Lower Shabelle, formal schooling exists in many areas but is dominated by non-government actors, leading to variable quality, infrastructure stress, and limited reach, especially in rural zones. Overall, systemic challenges – such as weak regulation, funding shortages, and environmental risk –

remain significant obstacles.

According to the Education Ministry of Education, Culture and Higher Education's (MoECHE) statistics, in 2020 Lower Shabelle had 140 formal schools, of which 67 are primary only, 69 are primary + secondary, and 4 are purely secondary. Many schools in Lower Shabelle are non-governmental/private: data from 2016/17 shows only 1 government-run primary school out of 36 total formal schools in Lower Shabelle. (FGS, 2018).

Because so many schools are private or community run, regulation, quality, and funding can be inconsistent (INTERSOS, EU, 2016).

In Bay region there is support from NGO and international donors, but systemic issues – especially around teacher quality, gender equity, and crisis resilience remain major obstacles. The presence of the University of Southern Somalia is a positive sign for higher education, but the base (primary and secondary) needs stronger, more sustainable investment. (MoECHE, 2017).

Communication infrastructures

Poor road networks and seasonal flooding limit physical connectivity, which indirectly affects communication by restricting movement of people, goods, and information.

Roads are often unpaved, making market access difficult, especially during the rainy season.

The top priorities identified by United Nations High Commissioner for Refugees (UNHCR) are: rehabilitation of pre-war roads; main roads are almost all now completely broken and cause travel times multiples of what they were pre-war; most gravel feeder roads are impassable when it rains, leaving farms isolated and fresh fruits and vegetables to spoil; when they are passable, they and the main roads are so broken that by the time fruits and produce like tomatoes reach the market they are all smashed up (FAO and WB, 2018).

Transporters, especially *bajaaj* (rickshaw) and motorbike drivers, move both people and goods between rural and urban areas as well as within Baidoa Town.

In irrigated areas, during river floods – which can happen even when there is less rain – there could be a need to use boats to transport grain from farms to drier areas. In the riverine regions, a large proportion of historical farming communities have left the area due to security concerns. Most still remain in IDP camps or in cities. Furthermore, there are no training provided to new farmers settling in these areas. (SATG and EU, 2019; FAO and UNDP, 2024).

The only positive infrastructure development since the start of the civil war has been the rapid expansion of mobile phone service. It has allowed rural communities to communicate with nearby urban markets about input and output prices, facilitated receipt of remittances from the diaspora and payments for all kinds of purchases, and provided access to updated information on domestic and international developments and the availability of local services.

Members of a farmers' cooperative participating in a FGD in Afgoye, described the importance of improving communication through district committees and farmer associations. (Afgoye, FGD with farmers, 1st mission).

Internal displacement

According to the Annual Report (2024) from UNHCR, about 555,000 internally displacements were recorded – 53% by conflict, mostly in Gedo, Lower Juba, and Banadir; 26% by flood, impacting Belet Weyne and Afmadow mostly; and 2% by drought, mainly in Laas Caanood and Gardo. Extreme weather conditions, including flooding along the Shabelle and Juba rivers, displaced communities, disrupting agriculture and increasing food insecurity. Climate and conflict-related displacement strained urban areas like Mogadishu, Baidoa, and

Kismayo, which continued to receive large influxes of IDP (UNHCR, 2024).

Displaced populations increase pressure on the communities where they settle and competition over natural resources and income earning opportunities (FAO, 2012). Bay and Bakool's inhabitants are primarily agropastoralists and are therefore vulnerable to droughts. Mobility is one of the key coping mechanisms employed to deal with livelihood losses, and people from the two regions make up the majority of internally displaced people across Somalia.

Unconditional cash transfers from the NGO to the IDP communities occasionally limits the availability of sufficient farm contributing to the reduction of land cultivated (FAO and UNDP, 2024).

In the first mission, farmers in FGD, argued that unconditional cash transfers from NGO discourage workers to work. They rather register with an IDP where they will receive around $80 a month than to work. Cash transfer induced IDP.

5.7 Conclusion – Social analysis

FQ3. Is the sesame value chain in Somalia socially sustainable?

The overall findings on the social sustainability of sesame production in Somalia are summarised in the radar diagram shown in Figure 5.6. This diagram presents the scores assigned to each of the six domains of the social analysis, disaggregated by sub-domains. Scores range from *not at all* (0-1), indicating situations that pose a high risk to the value chain social sustainability, to *moderate/low* (1-2) for moderate risk, *substantial* (2-3) where social sustainability conditions are considered generally positive, and *high* (3-4) for very positive outcomes.

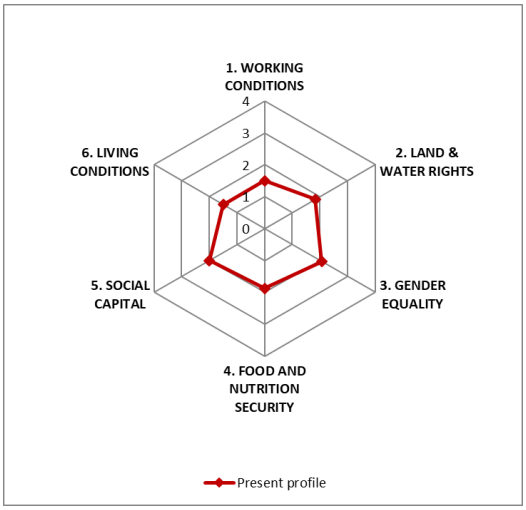

FIGURE 56: RADAR CHART – SOCIAL ANALYSIS
Source: Authors' analysis using VCA4D Social Profile tool

The application of the social sustainability VCA4D methodology to the sesame value chain identified **working conditions** and **living conditions** as the domains of greatest concern, scoring moderate-low, with average scoring 1.5. Land and water rights, food and nutrition security have average scores below 2. Gender equality and social capital were also scored moderate-low, with average scores bellow 3. Consequently, the social profile of the value chain is relatively low, highlighting the challenges faced by the majority of its actors across

the six domains. The scoring of all 63 questions in the social profile was conducted in close collaboration with Somali colleagues, ensuring contextual relevance and accuracy.

DOMAIN	PRESENT PROFILE	
	SCORE LEVEL	COUNT
1. WORKING CONDITIONS	**Moderate/Low**	1.50
2. LAND & WATER RIGHTS	**Moderate/Low**	1.83
3. GENDER EQUALITY	**Moderate/Low**	2.07
4. FOOD AND NUTRITION SECURITY	**Moderate/Low**	1.88
5. SOCIAL CAPITAL	**Moderate/Low**	2.00
6. LIVING CONDITIONS	**Moderate/Low**	1.50

Overall Recommendation by type of actor

The application of the social sustainability methodology to the sesame VC identifies working conditions and living conditions as domains of greatest concern followed by land and water rights, food and nutrition security. Gender equality and social capital have a slightly higher score, yet still rather low. Small-scale farmers producing sesame, which account for the vast majority of VC actors, face a range of risks and vulnerabilities. Land preparation is often done manually or with simple tools. Workers in the sesame sector, face poor working conditions based on informal agreements, and limited protection. Beyond production, working conditions in sesame processing - particularly in small and medium-scale oil extraction plants -are also challenging. Oil millers either use very low mechanisation or were able to improve their milling structures yet lacking any kind of regulation to improve oil quality. Much of the machinery used in these facilities is obsolete, inefficient, and poorly maintained, which reduces productivity and can pose safety risks to workers. ural populations are embedded within rural socio-cultural organisation, with an important role of traditional authorities that compensates a non-existent governmental environment. Exporters are compelled to do several post-harvest operations to comply with the external demands. They have built reliable networks with middlemen/middlewomen and brokers who buy the sesame grain from farmers at lower prices with no bargaining. They would like to benefit more from the governmental institutions although they are free to operate at their own will with high risk but no major constraints.

Major Issues – questions replied in red

The sub-questions scoring in red ("not at all"), across sub-domains, are primarily related to working and living conditions. These challenges are closely linked to the broader constraints faced by the Federal Government of Somalia, including persistent insecurity, weak institutional capacity, limited reach in rural areas, and fragmented authority. Together, these factors hinder the government's ability to effectively deliver basic services and safeguard citizens' rights. At the same time, displaced populations and agro-pastoralist communities are competing over already scarce resources, further exacerbating vulnerabilities. Among all domains assessed, living conditions emerge as the most critical. This is particularly evident for actors in the sesame value chain in Somalia, especially smallholder farmers, who experience persistently low incomes. Even earnings derived from sesame production, marketing, and related employment remain insufficient. As a result, these groups face inadequate access to basic services, poor housing and sanitation, and limited educational and training opportunities. Collectively, these constraints significantly undermine their well-being and resilience.

Risk/Cost of Non-Intervention vs. Benefits

Sesame production in Somalia faces multiple challenges. Low wages, limited capital, difficult working conditions, and climate variability make it unattractive to youth, who often migrate to urban areas. Women dominate labour but face resource, wage, and social constraints. Land and water tenure insecurity, weak governance, poor infrastructure, and limited producer influence reduce productivity and equity. Households remain vulnerable to food insecurity, conflict, and climate shocks. Isolation, inadequate services, and poverty persist, while humanitarian interventions only partially address these systemic economic, social, and environmental vulnerabilities.

Key Mitigating Measures
Key mitigating measures for improving Somalia's sesame sector include strengthening small farmers' bargaining power through cooperatives and collaborative agreements, implementing price stabilisation and minimum wages, and empowering traditional authorities. Support community-validated land tenure and flexible federal policies. Expand women's access to credit, land, training, technology, and markets, while reducing time poverty. Enhance climate-resilient practices, irrigation, storage, extension services, and market access. Strengthen social safety nets, healthcare, housing, and education via mobile clinics, community schools, and awareness campaigns. Promote inclusive governance and participatory planning to increase rural communities' influence.

TABLE 5-2: SOCIAL PROFILE – SCORES – RECOMMENDATIONS RISKS – MITIGATING MEASURES

Summary of sesame value chain social sustainability

The sesame value chain in Somalia has deep historical roots and plays a vital role in rural livelihoods and local economies. This highlights not only the crop's socio-cultural significance but also its sustainability and resilience within agricultural livelihood systems. Primarily cultivated as a cash crop, sesame provides essential income to poor rural households, which constitute most actors along the value chain.

Despite the clear expansion of sesame production in Somalia driven by higher market demand, the sector continues to be characterised by a vast majority of small-scale producers with low productivity, low quality products and limited market access. These challenges are compounded by inadequate access to agricultural extension services and essential inputs, including improved seed varieties, fertilisers, machinery and irrigation solutions. Small-scale farmers typically sell their sesame grains immediately after harvest to generate quick income, often with limited or no price negotiation. They also face serious post-harvest constraints being unable to store properly the surplus.

Much agricultural work in *sesame production is* informal, seasonal, or task-based. Workers may *be paid* daily, by the task, or in kind (e.g., food or subsistence goods or a share of the sesame harvested). Regular pay schedules or employment protections are often absent. Many agricultural workers have limited bargaining power, and wages may be irregular or below subsistence levels.

Land tenure is mainly informally attributed relying mainly on existent traditional norms. Competition over land is a primary driver of conflict in Somalia. For example, land grabbing in Southern Somalia has the interdependent effects of dispossessing powerless groups from their holdings, creating animosity, and engendering poverty. Women face restricted access to land and are underrepresented in the value chain, participating in sesame production activities as small-scale traders in local markets with limited opportunities for advancement. Sesame provides higher income. Yet, vegetables benefit women more due to the control they have over this crop income. Their perception of sesame production unpredictability drives some women to engage in trade and oil processing.
Beyond smallholder farmers, sesame production supports a wide range of participants, including wage labourers, middlemen and middle-women, traders, and exporters. In this sense, the value chain contributes significantly to rural employment, local market activity, and national foreign exchange earnings through its export orientation. It connects remote producers to global markets and creates income-generating opportunities across multiple nodes of the chain.

However, when assessed from a social sustainability perspective, important challenges emerge. Although the sector creates employment, wages for agricultural labourers are often insufficient to meet basic household needs. Weak or absent agricultural labour regulations, outdated farming tools and technologies, inadequate infrastructure, limited worker organisation, and entrenched socio-cultural norms all constrain decent working conditions. These factors reduce productivity while simultaneously limiting workers' capacity to negotiate fair compensation.

Power imbalances further undermine social sustainability. The relationship between small producers and exporters is economically and socially unequal. Smallholders often lack bargaining power over prices and have limited access to essential inputs, including technical knowledge, grain cleaning and sorting equipment, storage facilities, finance, and irrigation. This weakens their ability to add value and protect themselves from price volatility. The most vulnerable groups – particularly women, youth, and displaced populations – are disproportionately affected, as their access to land, resources, and community integration is shaped by customary law and other unequal social structures.

Additional structural constraints, such as land tenure insecurity, gender inequality, limited institutional support, and restricted access to financial services, perpetuate cycles of poverty, food insecurity, and malnutrition. These challenges also limit access to essential services such as healthcare and education, thereby reinforcing intergenerational vulnerability.

Sesame social sustainability depends on addressing structural inequalities, strengthening labour protections, improving access to resources and services, and enhancing the bargaining power and organisational capacity of small producers and workers. By tackling these systemic constraints, the sesame sector could evolve from a survival-based livelihood system into a more equitable and socially sustainable engine of rural transformation.

Cooperatives or farmers' associations are still important, mainly in Bay region, yet in the Southern region, they primarily function as entry points for accessing support from different NGO and INGO, usually in coordination with federal and state government structures. Many farmers' organisations have limited capacity to effectively represent their members' interests, despite the widespread presence of cooperative structures. The community-based organisations are the most effective grounds in which rural populations belonging to the same lineage can become empowered to take decisions with positive impacts on their livelihoods. This is the environment where we observe social capital being more effective, as the relation between vulnerable rural populations and governmental organisations do not seem to work effectively. NGO and INGO are the closest link to the policy environment.

High levels of food insecurity and acute malnutrition persist across Somalia. It is also important to note that the agricultural sector in the sesame producing regions, has been severely affected by conflict dynamics and recurrent climate-related shocks, including droughts and floods. These challenges are even more severe for women and children who are disproportionately affected by food insecurity.

Although this study focuses on analysing the livelihood conditions of actors in the sesame value chain, it is important to recognise that sesame production takes place in regions affected by two concurrent phenomena: nomadic populations forced into sedentarisation (agro-pastoralist livelihoods), and displaced populations dependent on humanitarian assistance who are seeking to integrate into the rural and urban economies of these regions.

As for the processing sector, micro- and small-scale processors, especially oil millers, produce mainly for the local markets. Limited resources – particularly access to finance for technical inputs and working capital – continue to hinder sustained growth across the sesame value chain. Scaling up oil processing operations, especially through the adoption of technological innovations and the accumulation of greater human and financial capital, entails substantial risks and presents a major challenge for rural oil millers.

6. VALUE CHAIN ENVIRONMENTAL SUSTAINABLITY

6.1 Agricultural and biodiversity

6.1.1 Land cover, land use history and biodiversity

According to FAO-SWALIM land-cover mapping for the Southern riverine zone (Annex VI), which includes the present study area, approximately 84% of the landscape is covered by natural vegetation, while **only 4% is under agriculture**, with the remaining 12% classified as bare area's (non-vegetated land) (FAO-SWALIM, 2007). Given the very small proportion of land currently devoted to agriculture relative to natural vegetation cover, **overall pressure from agricultural expansion on biodiversity at the landscape scale appears limited.**

Within the Southern zone, the **dominant natural vegetation type is wooded** vegetation, accounting for approximately 67% of natural vegetated surfaces (FAO-SWALIM, 2007). This category is largely composed of **open shrubland formations** (67%) and woodlands (24%). Rangelands constitute roughly one-fifth of natural vegetated areas, with savanna representing the dominant cover (63%). The remaining surfaces are covered by grasslands (Annex IIIa).

Insights from the farm-level survey (n = 30) suggest relatively **limited recent land-use change within the study sample**. Approximately one-third of sesame farmers reported that their land has been cultivated for multiple generations, indicating continuity of agricultural land use in these cases. Among farmers reporting land-use conversion, 42% indicated shrubland (wooded vegetation) and 22% extensive grazing land (rangeland) as the previous land use. This suggests that some conversion of wooded vegetation and rangeland to cropland has occurred, but that such changes remain modest in scale relative to the broader landscape context.

Importantly, pressures on wooded vegetation in Somalia are reported to be driven primarily by charcoal production and fuelwood extraction, rather than by agricultural expansion per se (FAO-SWALIM, 2007). Consequently, while localised land-use conversion for agriculture has occurred within the study area, broader biodiversity concerns in the region are more strongly linked to unsustainable wood extraction than to the expansion of sesame cultivation.

6.1.2 Diversity of agricultural production systems

No major concerns were identified regarding the direct impact of sesame cultivation on land cover and biodiversity. However, evidence from focus group discussions suggests potential constraints and **risks related to the diversity** of the agricultural production system, particularly with respect to **potential over dependence on sesame and limited varietal diversity.**

When comparing regions, clear differences can be found in terms of the number of sesame cropping cycles per year (Figure 6.1). In Bay, farmers almost exclusively cultivate two sesame cycles per year, while Jowhar also shows a predominance (>70%) of two sesame cycles per year. In contrast, two-thirds of farmers in Afgoye cultivate sesame only one cycle per year, linked to the sub-optimal climate conditions for sesame cultivation and the risk of flooding in the *Gu* (long rainy) season.

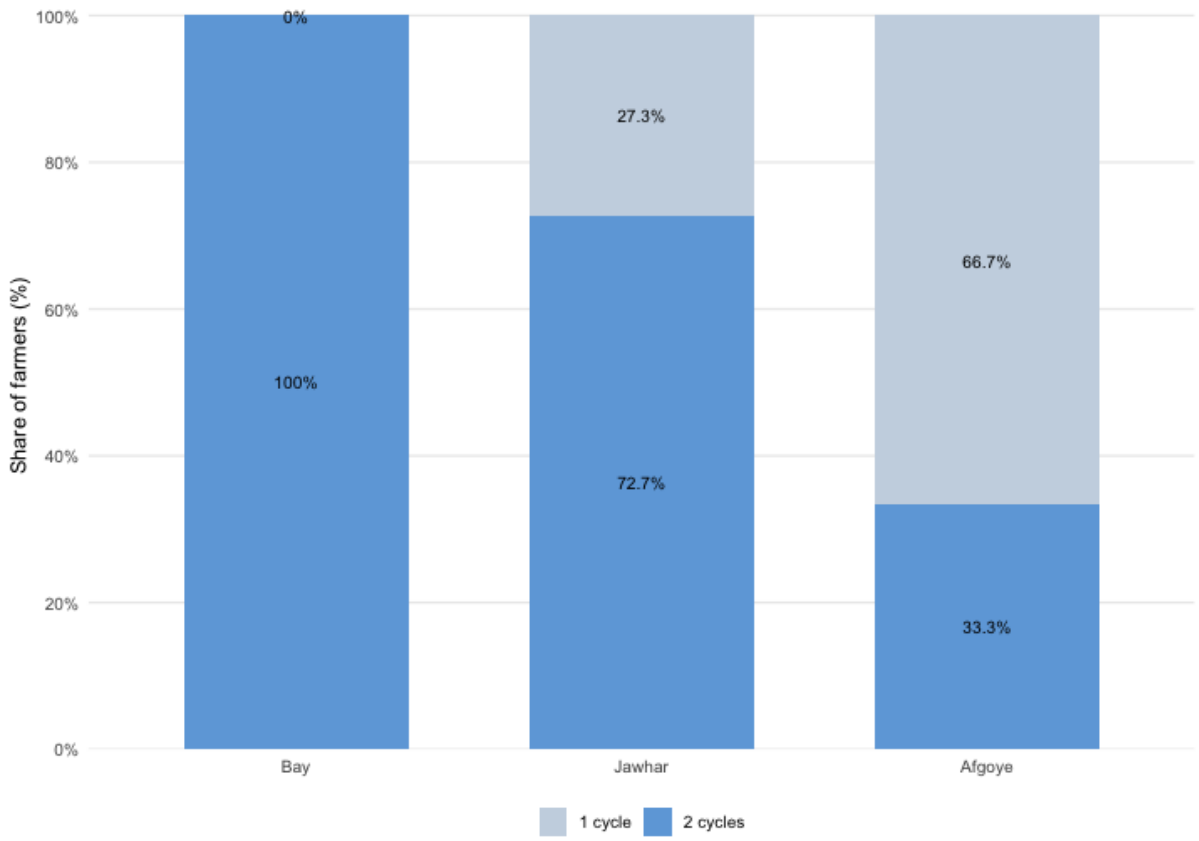

FIGURE 6.1: NUMBER OF SESAME CROPPING CYCLES PER YEAR, COMPARED ACROSS STUDY REGIONS (N = 30)
Source: Authors

In terms of land allocation, **sesame occupies a large share of total farm area** across seasons, most often exceeding half of the cultivated land and in several cases reaching 100% of the cultivated land, particularly in Jowhar (Figure 6.2). Other variants of this figure showing the mean values, or the medians and means for the years combined can be found in Annex VII. Furthermore, the results indicate that the proportion of cultivated land allocated to sesame differs by region, season and year, shaped by agro-ecological conditions and production constraints. Overall, this indicates that **many farmers are highly dependent on sesame cultivation**, which brings certain risks with it.

6.1.3 Varietal diversity

All farmers reported cultivating sesame as a **monoculture, with practically all farmers** (> 95%) indicating the **use of a single locally adapted variety, *Dunyar***. Other varieties, including *Humera*, were previously introduced in parts of the study area through development interventions, notably the USAID-funded GEEL programme. Only one farmer in our sample reported using *Humera*. Farmers highlighted several limitations associated with introduced varieties, such as *Humera*, including higher susceptibility to pests, especially aphids, and **sub-optimal adaptation** to local agro-climatic conditions, as farmers mentioned that *Humera* is adapted to cooler climate conditions such as in Ethiopia rather than Somali climate conditions. Thus, farmers mentioned that *Humera* would result in lower yields compared to *Dunyar* under farmer field conditions in Somalia. Additionally, farmers highlighted the **unavailability of seeds** of *non-Dunyar* varieties as well as the perceived **high cost of certified seeds.**

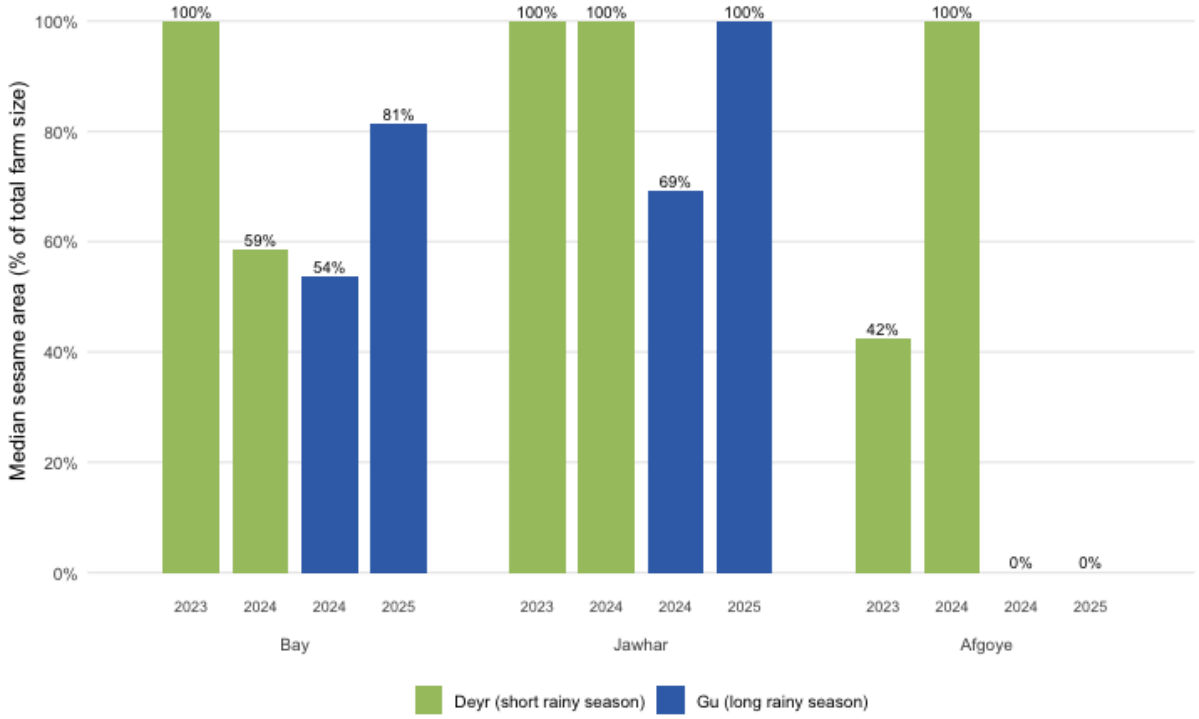

FIGURE 6.2: MEDIAN PROPORTION OF SESAME AREA (% OF TOTAL FARM SIZE) ACROSS SEASONS AND YEARS, COMPARED BETWEEN REGIONS (N = 30)
Source: Authors

Seed sourcing was reported to rely **mainly on informal systems**, including farm-saved seed and purchases from local markets. In Bay, all farmers reported using their own seeds, with roughly 80% of farmers in Afgoye reported using their own seeds. In contrast, only one-third of farmers in Jowhar reported using their own seeds. Nonetheless, certified sesame seed is produced within Somalia, seed companies were reported to multiply only the *Dunyar* variety, offering no alternative or improved varieties. Moreover, certified seed is primarily purchased by development actors rather than by farmers. Recent reductions in international development funding were reported to have resulted in substantial surpluses of certified seed, which companies have reportedly sold on local grain markets in order to recover production costs.

Farmers expressed **demand for increased applied research on sesame varieties**, particularly to (i) develop a purer white *Dunyar*-type variety in order to access higher market prices, and (ii) improve varietal resilience to climate-related shocks. This demand is consistent with feedback from major Somali companies active in the sesame value chain, which identified the lack of (white) colour uniformity as a structural weakness of Somali sesame in export markets. Additionally, it should be noted that sesame has an indeterminate growth habit, like tomatoes, which results in **non-uniform capsule maturation**, with a vertical gradient of maturity (FAO, 2023). Furthermore, many sesame varieties, like *Dunyar* grown in Somalia, have **dehiscent capsules**, meaning that it opens naturally at maturity. As a consequence of these two characteristics, capsule shattering before or during harvesting is a major constraint in sesame production, leading to significant yield losses. However, indehiscent or semi-indehiscent varieties have been bred and are in use in countries like the US and China. Research on sesame in Somalia is very limited, as a result collaboration with other countries on varietal research is also limited.

Overall, the findings point to a need for varietal research, including research on the (lack of) adoption of varieties, and strengthened seed systems, which are not over reliant on international development actors.

6.2 Water use

6.2.1 Irrigation as the main driver of water use

Sesame in Somalia is cultivated using **three types of water provisioning systems**: (i) **rainfed**, (ii) **non-motorised irrigation and** (iii) **motorised irrigation.** On average, based on our study sample, which is not fully representative for the country, but nonetheless gives a rough indication, about half of sesame farmers use rainfed systems. The other half rely on irrigation, of which about half uses motorised engines to pump water while the other half doesn't use engines to channel the water into sesame fields (Figure 6.3). While the national average should be considered with some caution, **clear differences** can be seen **when comparing regions**. All sesame farmers in Bay rely on rain, while half in Jowhar rely on rain, but only few (<10%) rely on rain in Afgoye. In Afgoye, more than 90% of farmers rely on irrigation, with the majority using motorised irrigation. While about half of farmers in Jowhar use some kind of irrigation, only few (<10%) use motorised irrigation systems (Figure 6.3).

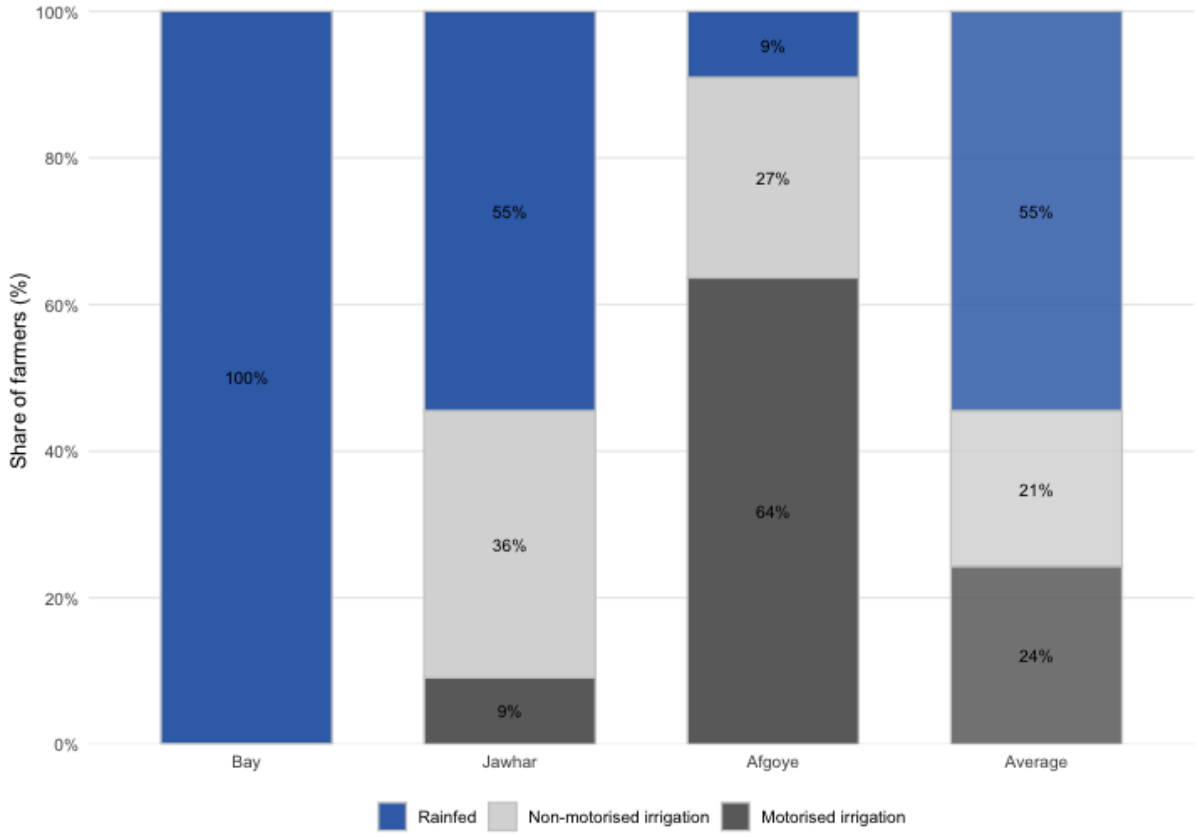

FIGURE 6.3: PROPORTION OF FARMERS USING A SPECIFIC TYPE OF SYSTEM TO WATER SESAME PER REGION (N = 30)
Source: Authors

Practically all farmers that use irrigation systems for sesame cultivation in Somalia **use basic furrows**, rather than drip or sprinkler irrigation systems. The water in the furrows is typically filled up to a height of about 20 – 30 cm. Those that irrigate sesame in *Deyr*, apply water 1 to 3 times per season, with a median frequency of 2 times per season.

Those that irrigate sesame during the *Gu* season in Jowhar only irrigate once per season. In Afgoye, half of farmers that irrigate sesame during *Deyr*, do not irrigate sesame during *Gu* season. Those farmers in Afgoye

that do irrigate sesame during *Gu*, most only irrigate once per season, instead of 2 times in *Deyr* season. As farm visits were not possible due to security concerns, it was not possible to provide a quantitative estimate of the amount of water used for sesame cultivation.

In conclusion, **irrigation is more commonly used by farmers in *Gu* season,** and the **application frequency and thus water consumption is also higher in *Gu* than in *Deyr***. Given the regional differences in rainfed versus irrigated systems, we can say that sesame production in Bay consumes the least amount of water for irrigation, followed by Jowhar, with Afgoye consuming the most amount of water for irrigation.

Given that the **irrigation infrastructure is deteriorated** in many areas, large amounts of water are lost during transport before even reaching the agricultural lands. This makes irrigation severely less efficient in terms of water use, and impedes control over the flow of water, which **limits the allocation efficiency as well as the capacity to prevent and control floods**, which in turn results in negative side effects (e.g., soil erosion, damage to infrastructure and human health impacts).

In this context, the EU will finance with the bilateral portfolio the **JOSP programme**. The Jowhar Offstream Storage Programme (JOSP) is a large multi-year initiative aimed at improving water security, climate resilience, agricultural productivity, and livelihoods **along the Shabelle River** in Somalia, particularly in the Middle and Lower Shabelle regions. The programme aims to benefit around 1.65 million people, including about 368,000 farmers who will gain improved access to irrigation water.

The core component of the programme is the rehabilitation of the Jowhar Offstream Storage system, a **water management infrastructure** originally built to regulate the flow of the Shabelle River. The system historically reduced flooding **during wet seasons by diverting excess water into the Hawaadley** reservoir, **while releasing stored water during dry periods for irrigation**. Since the collapse of the system during the civil war, the region has become increasingly vulnerable to floods, droughts, and agricultural losses, as reflected in the focus group discussions and interviews carried out in this study.

Beyond infrastructure rehabilitation, JOSP integrates a broader set of interventions focused on natural resource management, climate-smart agriculture, value chain development, conflict mitigation, durable solutions for displaced populations, and improved water governance. The programme is implemented through a partnership led by the FAO in collaboration with several UN agencies, the EU and Somali government institutions, ensuring that infrastructure investments are accompanied by social, environmental, and governance reforms.

6.2.2 Processing as minor driver of water use

Besides irrigation, the only other part of the sesame value chain within Somalia where significant amounts of water are used, is during the dehulling process in case of sesame seed intended for export. Major Somali processing companies currently still rely on old ‘wet’ dehulling machines which consume significant amounts of water (1.66 litre/kg sesame). Currently, the **sector is replacing the ‘wet’ dehulling machines with ‘dry’ machines thereby reducing water consumption** fifty-fold to 0.033 litre/kg sesame. Thus, we can conclude that the major driver of water consumption across the sesame value chain in Somalia is irrigation, not processing.

6.4 Challenges faced by sesame farmers

6.4.1 Major reported sesame yield limiting factors

Major yield limiting factors reported by farmers differ greatly between seasons, and significant differences are also clear when comparing challenges between **regions**.

Looking at the *Gu* **season**, the primary reported yield limiting factor are pests and diseases for Bay, Jowhar and Afgoye, respectively reported by 74%, 91% and 70% of farmers per region (Figure 6.4). **Aphids**, likely *Aphis gossypii*, being the major pest being in all three regions. The **sesame capsule borer** (*Antigastra catalaunalis*) was also reported as a **major pest** in Jowhar. The borer is known to be one of the most important pests of sesame worldwide, particularly in Africa and South Asia. Other minor reported pests were dessert locusts (*Schistocerca gregaria*) and stem weevils (*Alcidodes dentipes*). Powdery mildew (*Oidium sesame*) was also reported as a minor disease during *Gu* season. Some flooding was reported in Bay, while waterlogged soils were reported in Afgoye and Jowhar.

The second most important yield limiting factor reported by farmers was again aphids in Bay and Afgoye (Figure 6.5). In contrast, the second most important yield limiting factor in *Gu* season according to farmers in Jowhar are weevils. In Bay, flooding and waterlogged soils were also mentioned frequently.

The **major yield limiting factors** as reported by farmers for ***Deyr*** seasons differ from those of the *Gu* season (Figure 6.6). Moreover, in Bay, 75% of farmers reported **droughts** as the primary yield limiting factor, with the remaining 25% identifying **pests and diseases**. In contrast, in Jowhar and Afgoye, about 60% of farmers reported pests and diseases as the major limiting factor. The major pest in the *Deyr* season are **aphids**, as in the *Gu* season. The remaining 40% reported droughts and high temperatures as the main constraint.

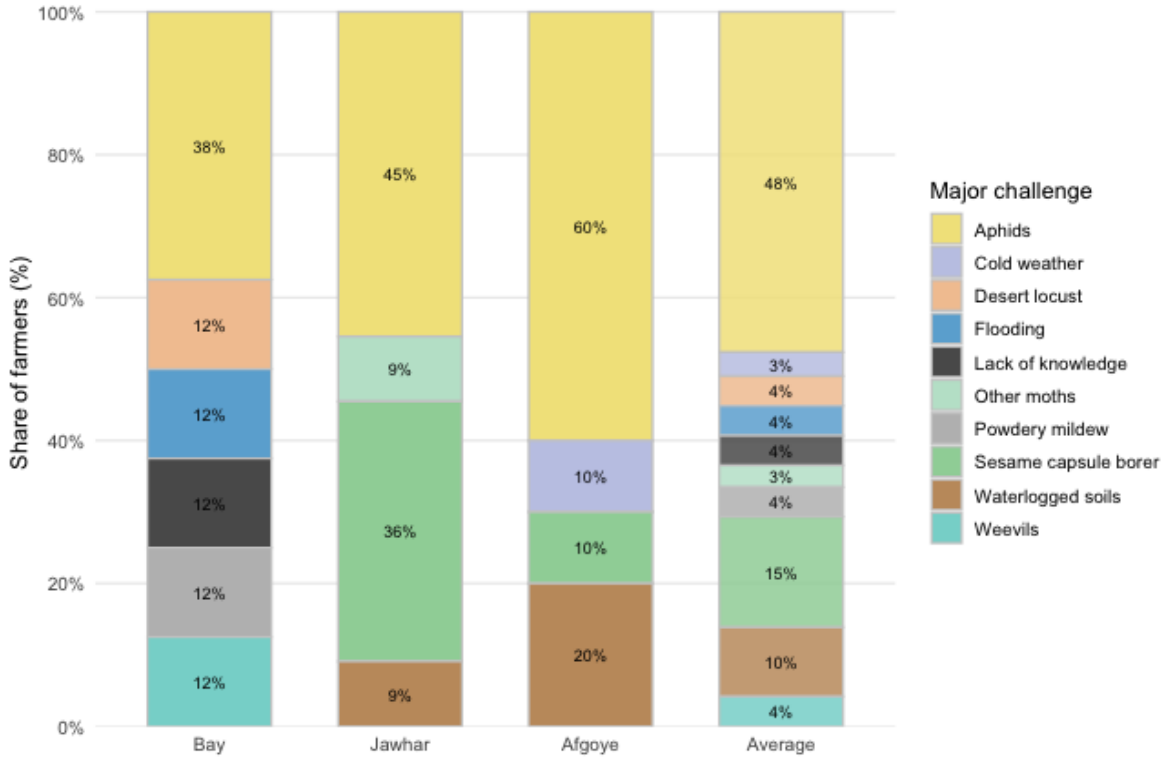

FIGURE 6.4: THE MOST IMPORTANT MAJOR SESAME YIELD LIMITING FACTOR IN GU SEASON AS REPORTED BY FARMERS (N = 30) AS PART OF A TOP 3 RANKING EXERCISE

Source: Authors

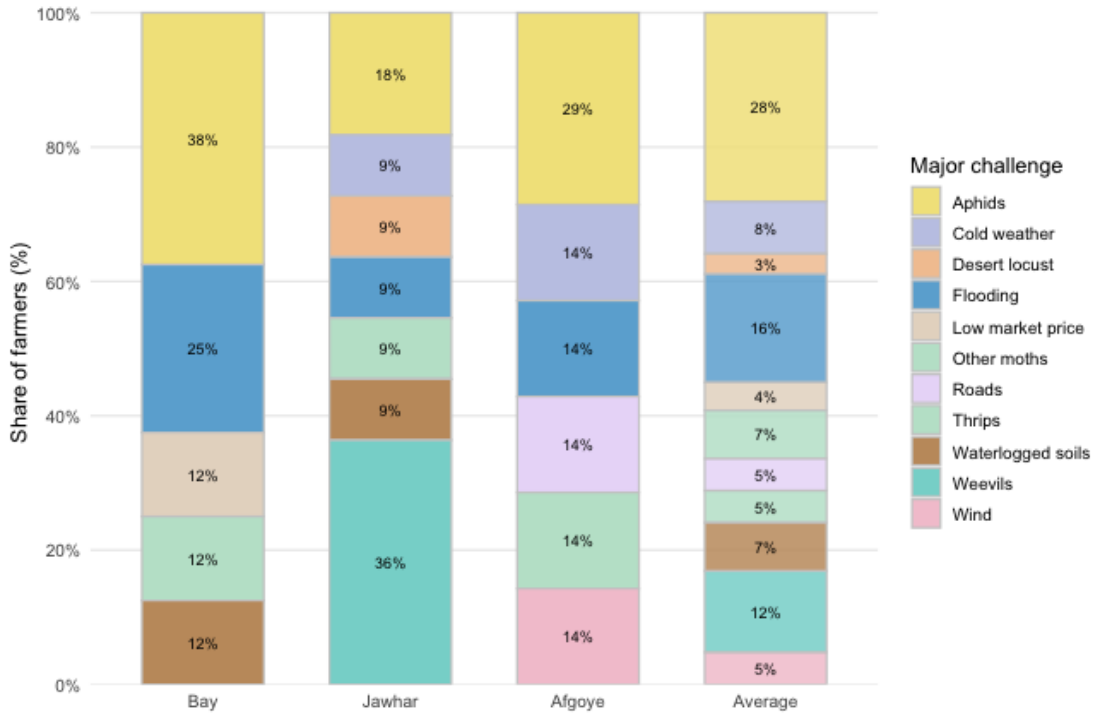

FIGURE 6.5: SECOND MOST IMPORTANT MAJOR SESAME YIELD LIMITING FACTOR IN GU SEASON AS REPORTED BY FARMERS (N = 30) AS PART OF A TOP 3 RANKING EXERCISE

Source: Authors

Thus, while clear differences exist between regions and seasons, overall, the **two major yield limiting factors** according to farmers are (i) **pests and diseases**, especially aphids, and (ii) climatic effects, namely related to droughts or floods depending on the season.

Across both seasons, water-related stresses play a major role, but in opposite directions: Too much water in *Gu*, while too little (and too hot) in *Deyr*. This suggests that **water infrastructure and control, not only agronomic practices, are central constraints.**

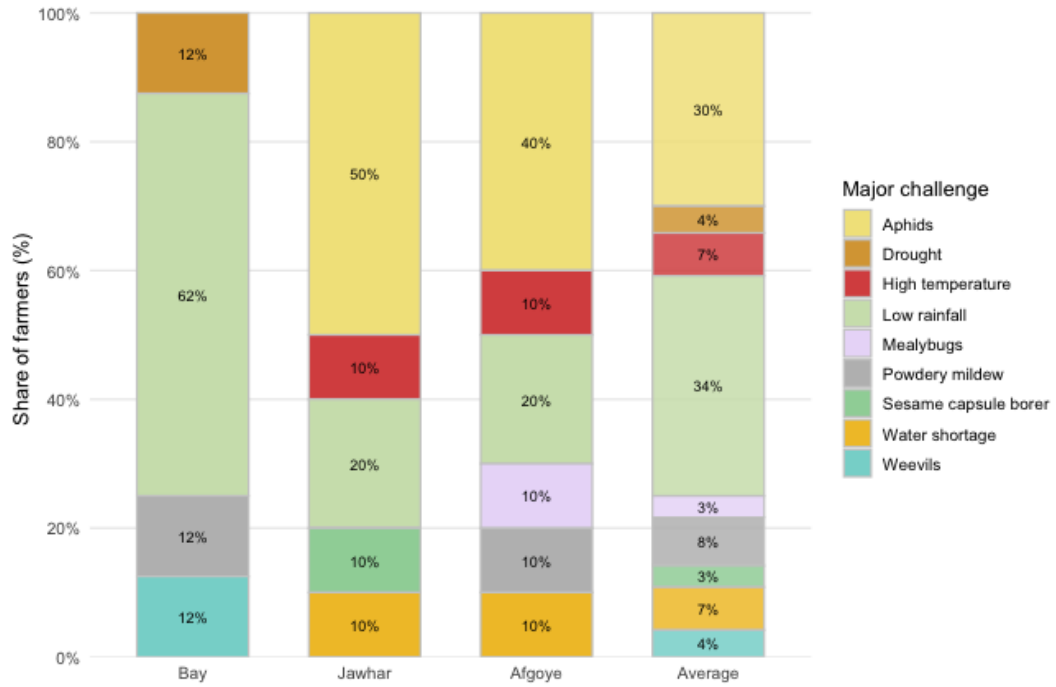

FIGURE 6.6: THE MOST IMPORTANT MAJOR SESAME YIELD LIMITING FACTOR IN DEYR *SEASON AS REPORTED BY FARMERS (N = 30) AS PART OF A TOP 3 RANKING EXERCISE*
Source: Authors

6.4.2 Major broader challenges related to sesame cultivation reported by sesame farmers

Based on the farmer surveys and focus groups discussion, the major challenges sesame farmers face, not only related yield, are the following: In **Bay**, the main challenges are (i and ii) pests and diseases, and droughts, (iii) lack of mechanisation of agricultural work, (iv) limited access to knowledge and inputs, and (v) soil degradation and fertility. In **Jowhar**, the main challenges are (i) pests and diseases, (ii) floods and the lack of irrigation infrastructure, (iii) droughts, (iv) lack of market access, (iv) limited knowledge of safe use of pesticides. In **Afgoye**, the main challenges are (i) floods, (ii) pests and diseases, (iii) market access, (iv) droughts, and (v) knowledge constraints.

All regions face major challenges related to climate shocks, but the type of shock, its impacts, and the appropriate responses differ markedly by region. In Bay, the dominant climate shock is recurrent drought, which frequently leads to complete crop failure. In Jowhar, farmers face a dual climate challenge: severe flooding – the primary constraint – closely linked to irrigation infrastructure failure, alongside periodic droughts affecting rainfed producers. In Afgoye, climate shocks are driven mainly by flooding, which is generally less severe than in Jowhar but still causes substantial production and infrastructure damage, while pest pressure is particularly prominent.

Pests and unsafe pesticide use emerge as a common challenge across all regions, reflecting widespread knowledge gaps, limited regulation, and heavy reliance on advice from local small agro-shops. Similarly, limited access to information on good agricultural practices affects all regions, but this constraint is most acute in Bay, where farmers receive even less support from NGOs and government services due to distance from Mogadishu and persistent security challenges.

Market access constraints are also shared across regions, though the underlying causes differ. In Bay, market access is primarily constrained by insecurity, whereas in Jowhar and Afgoye it is driven by physical access problems, including damaged roads, flooding, and muddy conditions that disrupt transport. A challenge largely specific to Bay is low mechanisation, driven by the limited availability and high cost of tractors, which constrains timely land preparation and reduces production efficiency.

6.4.3 Farmer proposed solutions to broader challenges in sesame production

In **Bay**, sesame farmers proposed trainings in Integrated Pest Management (**IPM**), assistance with **mechanising farm operations**, improving market access by addressing **security** concerns and **drought-related interventions** such as soil and water conservation structures as well as Climate Smart Agricultural (CSA) practices.

In Jowhar and Afgoye, sesame farmers prioritised the **rehabilitation of irrigation and flood control infrastructures,** while also proposing training on IPM given the major challenges relating to pests and diseases. Given that market accessibility can be challenging, the farmers in Jowhar and Afgoye see **agricultural feeder roads** as an important enabling factor.

6.5 Fertiliser use affects sesame yield and environmental impact

6.5.1 Mineral fertiliser use

Across the study sample, **60%** of sesame farmers **use some kind of mineral fertiliser** on their sesame crop. Similarly, 53% of sesame farmers use some kind of mineral fertiliser on some of their other crops. Therefore, in Somalia, it does not seem like most farmers treat sesame as a crop which is left on its own to grow without inputs. This contrasts sharply with for example sesame cultivation in Tchad where practically no one uses mineral fertilisers on sesame, though largely due to the inaccessibility thereof.

While more than half of sesame farmers use mineral fertilisers on sesame, **noteworthy differences can be seen between regions**, with only 38% of sesame farmers in Bay using mineral fertilisers, while almost three-quarters, roughly double, use it in Jowhar and Afgoye (Figure 6.7).

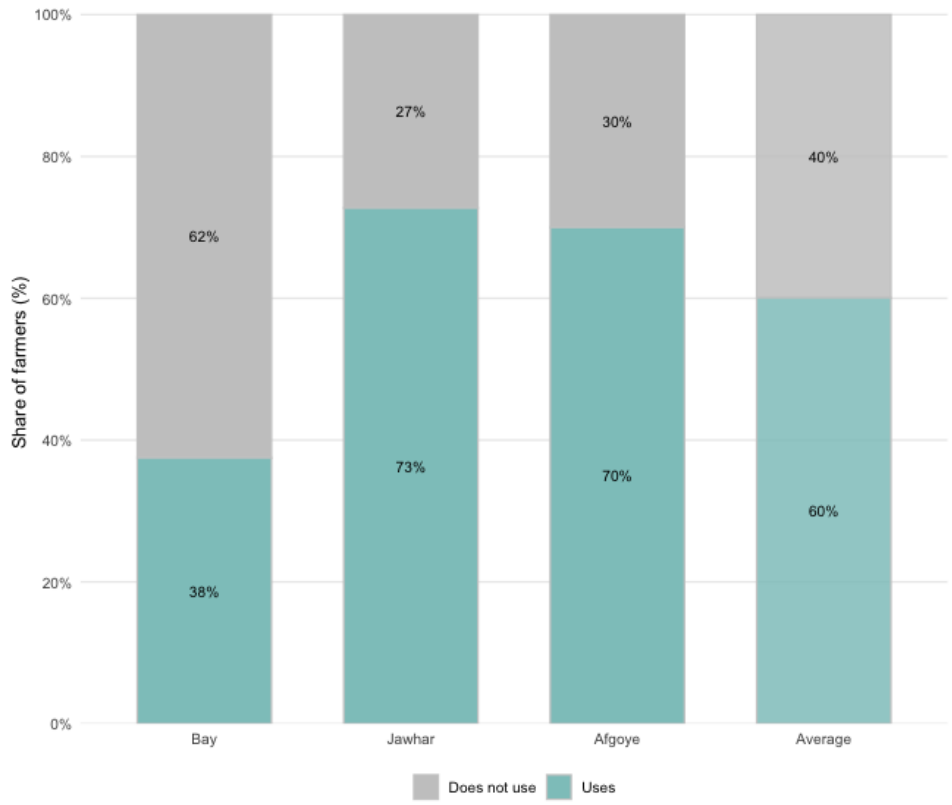

FIGURE 6.7: PROPORTION OF FARMERS USING MINERAL FERTILISERS FOR SESAME PRODUCTION PER REGION (N=30)
Source: Authors

Among those farmers who use mineral fertilisers for sesame cultivation, the **most used mineral fertiliser is DAP, followed by urea**, with only very few using Nitrogen, Phosphorus, Potassium (NPK) or TSP. 35.1% of farmers use Diammonium Phosphate (DAP) on sesame, 21.6% use urea, 8.1% use TSP and 2.7% use NPK. Furthermore, the type of fertiliser use is dependent on the region, with Bay farmers mainly relying on DAP. Urea use was only observed in Afgoye and Jowhar, not in Bay.

Median application rates for **DAP** were found to be **33 kg DAP/ha,** with a minimum of 12 kg DAP/ha and maximum of 150 kg DAP/ha. In practical terms this means median application rates of **6 kg N/ha and 15 kg P_20_5/ha** coming from DAP, with a minimum of 2.2 kg N/ha and 5.5 kg P_20_5/ha, and a maximum of 27 kg N/ha and 69 kg P_20_5/ha among those who apply DAP.

Median application rates for **urea** were found to be **40 kg urea/ha**, with a minimum of 10 kg urea/ha and maximum of 100 kg urea / ha among those who apply urea. In practical terms this means median application rates of **18.4 kg N/ha from urea**, with a minimum of 4.6 kg N/ha and maximum of 46 kg N/ha. Median application rates for NPK and TSP are not reported as the number of observations is too small.

A **typical recommended nutrient** range for sesame cultivation is 40–75 kg nitrogen (N) per hectare, 30–60 kg phosphorus (P_2O_5) per hectare, and 30–50 kg potassium (K_2O) per hectare (Weiss, 2000; Langham et al., 2008; FAO, 2023). Though this should be interpreted as a general recommendation and soil analysis should ideally be done to give more precise guidance. When comparing the recommended range with our findings this suggests that even among fertiliser users, sesame cultivation in Somalia remains a relatively low-input production system, with nitrogen application reaching roughly 30–60% of recommended levels and

phosphorus application roughly 25–50% of recommended levels. As NPK is the only form of K-containing fertilisers observed in our study and was only used by 2.7% of farmers, potassium fertilisation appears to be practically absent in sesame cultivation in Somalia. In other words, Somali sesame systems appear to be strongly skewed toward N and P fertilisation, with **potassium being largely neglected** and the most priority being given to nitrogen**.**

Typical additional nutrient applications reported in sesame agronomy studies include approximately 20–45 kg sulphur (S) per hectare, about 20 kg magnesium (Mg) per hectare, 2–5 kg zinc (Zn) per hectare, 1–2 kg boron (B) per hectare, and 3–5 kg manganese (Mn) per hectare (FAO, 2023; Sarkar et al., 2014; Shehu et al, 2014; Weiss, 2000). **Sulphur is particularly important** for oilseed crops, because it contributes to protein and oil synthesis (Weiss, 2000). However, none of the sesame farmers in our study were found to apply any of these nutrients via mineral fertilisers.

6.5.2 Organic fertiliser use

About **40%** of farmers **use organic soil inputs** (Figure 6.8). In line with the findings for the mineral fertilisers, the share of farmers using organic soil inputs is **lowest in Bay** region. Slightly more than half of farmers in Jowhar and Afgoye use organic fertilisers, while it is very uncommon in Bay.

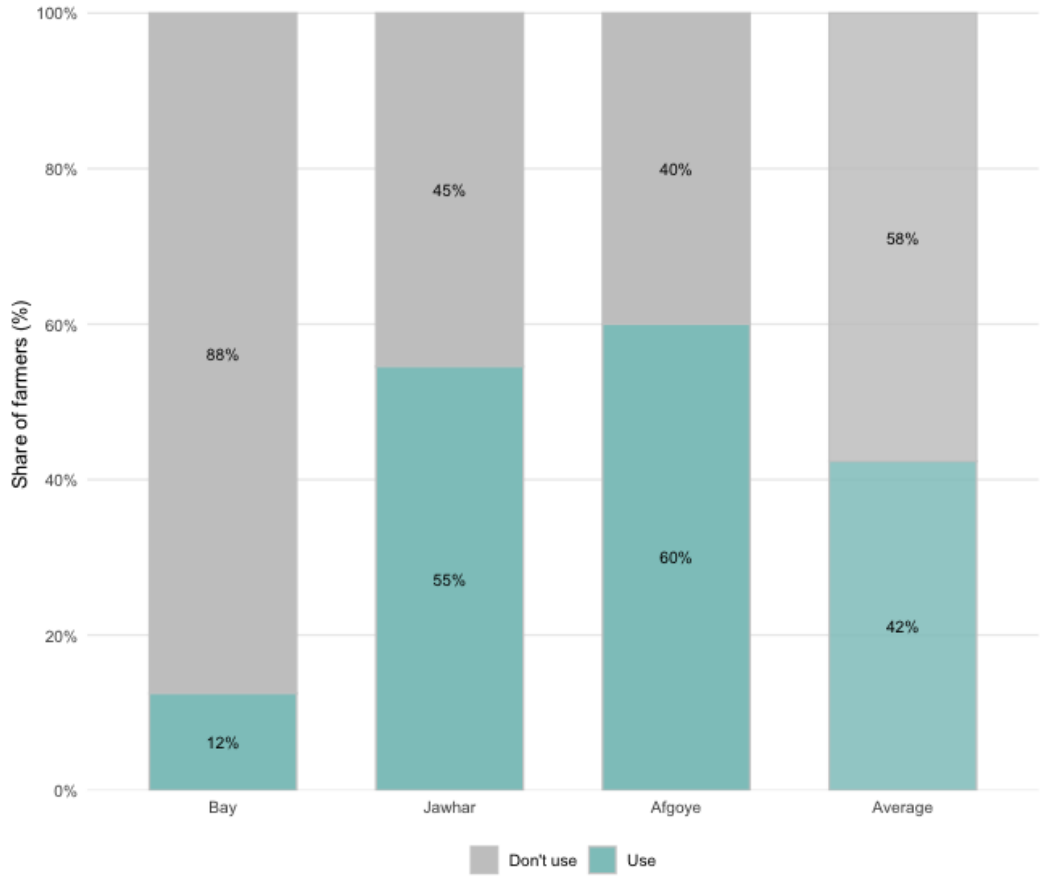

FIGURE 6.8: PROPORTION OF FARMERS USING ORGANIC FERTILISERS FOR SESAME PRODUCTION PER REGION (N=30)
Source: Authors

6.5.3 Combined use of mineral and organic fertilisers

Overall, across regions, on average only **20% don't use any kind of soil input, while 22% use a combination of mineral and organic fertilisers** (Figure 6.9). On average, 20% use organic only, while 38% use mineral only. **Large differences** can be observed **between regions**, with all farmers in Afgoye and most in Jowhar using at least some kind of soil input. In contrast, half on farmers in Bay regions don't use any type of soil input. The share of farmers using only mineral inputs is similar across regions, being about 40%. About one-third of farmers in Jowhar and Afgoye use a combination of mineral and organic fertilisers, while none do so in Bay. Additionally, it should be noted that **none of the farmers reported using agricultural lime.**

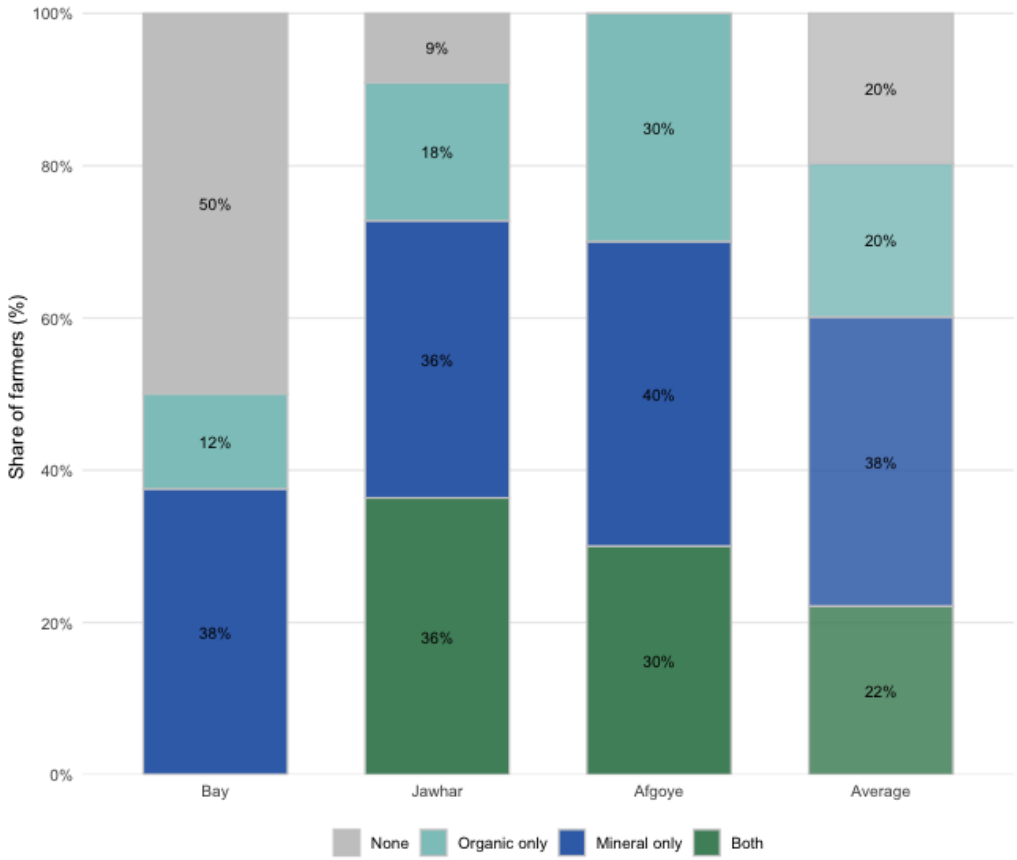

FIGURE 6.9: PROPORTION OF FARMERS USING NO FERTILISERS, ONLY ORGANIC, ONLY MINERAL OR ORGANIC AND FOR SESAME PRODUCTION PER REGION (N=30)

6.6 Acidification & eutrophication

As less than 25% of farmers reported using N-based mineral fertilisers to cultivate sesame and median application rates were 40 kg urea/ha, **acidification** due to excessive use of N-fertilisers is likely **not a major concern** in most cases. As sesame farmers in Bay do not use N-fertilisers, there is minimal risk of acidification due to sesame cultivation in this region.

In general, N- and P-based fertilisers are often considered the main contributors to **eutrophication**. However, the above should be considered within a broader context. It is important to note that, in Sub-Saharan Africa (SSA), wastewater from sewage and industries in urban areas, often discharged untreated into the environment, is the primary source of nutrients causing eutrophication of surface water bodies (Nyenje et al., 2010). This is fundamentally different from eutrophication in the so-called North (Nyenje et al., 2010), which is mainly caused by agriculture due to the excessive use of fertilisers in combination with soils that do not fix P, in contrast to most soils in SSA. However, as soil erosion is quite common and a serious problem in sesame production zones in Somalia, this might contribute to eutrophication.

6.7 Human health affected by insecticides

Insecticide use in sesame production is widespread, with around **90% of farmers** reporting application (Figure 6.10), **reflecting the high pest pressure** perceived as a major production challenge across the study regions. Compared to other crops grown by the same farmers – where about 75% reported insecticide use – sesame shows a higher reliance on chemical pest control. While insecticide use in sesame cultivation is the norm, **fungicide use** in sesame was **not reported**, with only 12% of farmers reported using fungicides on other crops, thereby indicating that chemical exposure risks are primarily linked to insect pest management rather than fungal disease control.

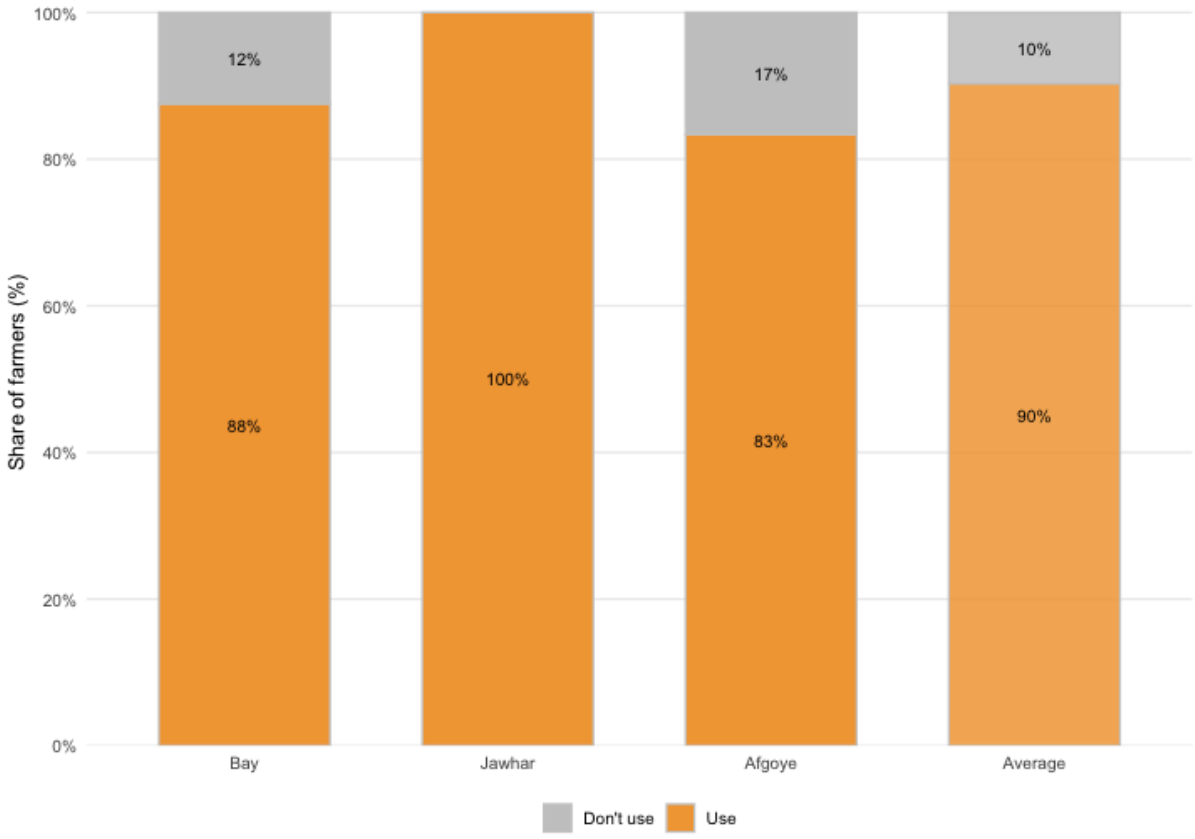

FIGURE 6.10: PROPORTION OF FARMERS USING INSECTICIDES FOR SESAME CULTIVATION PER REGION (N=30)
Source: Authors

The insecticides used during sesame cultivation **largely fall within WHO hazard Classes II (moderately hazardous) and III (slightly hazardous); however, limited use of WHO Class Ib (highly hazardous) insecticides** was also reported, notably methomyl-based products (e.g., Agrinate). Methomyl has been withdrawn from approval in many European countries due to human health and environmental concerns,

while in the United States it is classified as a restricted-use pesticide, limited to trained applicators. These regulatory restrictions reflect the high risks associated with its use and suggest the need to assess whether safer alternative pest control options could be promoted in sesame production contexts where regulatory oversight and user training are limited.

Overall, the products applied mainly belong to IRAC Group 1 (acetylcholinesterase inhibitors) and IRAC Groups 3 and 4 (neuroactive insecticides), which are associated with **acute toxicity risks**. FGDs revealed **highly unsafe handling behaviours**, including reports of farmers tasting insecticides to verify product quality, a practice that has reportedly resulted in fatal poisoning incidents, as well as the reuse of empty insecticide containers as drinking vessels. Farmers also explicitly acknowledged gaps in their knowledge regarding safe pesticide use and expressed a **clear demand for training** and information on safe handling, storage and application practices.

6.8 Energy demand and fossil resources depletion

6.8.1 Sesame production as major driver of energy consumption

Fertilisers

Nitrogen-based fertilisers are highly energy-intensive as they are produced via the Haber-Bosch process, which converts nitrogen from the air and hydrogen (usually from liquified natural gas) into ammonia. Phosphorus fertilisers use much less energy as they are made from phosphate rock through chemical processing. Typically, 20 – 23 GJ of energy is used to make a ton of urea, while DAP production requires 4-7 GJ / ton.

An estimated 43% of Somalia sesame farmers use DAP for sesame cultivation, with median application rates of 33 kg DAP / ha / season. Less than 25% of farmers in Somalia use urea, with a median rate of 40 kg urea / ha / season.

This results in an energy consumption of 132 – 231 MJ/ha/season for DAP users, and 800 – 920 MJ/ha/season for urea users. This equates to 3.7 – 6.4 litre diesel equivalent / ha for DAP or TSP and 22 – 26 litre diesel equivalent / ha for urea users. Assuming a median yield of 325 kg sesame per hectare, this equates to 11.4 – 19.7 litre of diesel per ton of sesame for DAP users and 67.7 – 80 litre diesel per ton sesame for urea users.

Tractors and mechanisation

Practically all farmers sow sesame manually, not using any motorised equipment. In contrast, practically **all farmers (>95%) use tractors for ploughing**, which consumes about 13.33 litres diesel / ha / season, equating to 41.0 litre diesel / ton sesame. Calculations are based on the number of hours required to perform a certain activity with a tractor covering 1 ha, using a fuel consumption of 4.44 litre diesel per hectare based on interviews with tractor owners and operators. **Levelling** of the field is done using a tractor by most farmers in Jowhar and Afgoye, while about three-quarters of farmers in Bay do this manually. Similarly, **furrowing** is done using a tractor in Jowhar and Afgoye, while done manually in Bay, if done at all in Bay. Levelling and furrowing each take about 1.5 hours per hectare, thus each consuming 6.66 litre diesel per hectare, equating to 20.5 litre diesel / ton sesame. Thus, on average, sesame farmers in Bay consume about 41.0 litre diesel / ton sesame, due to tractor ploughing, while farmers in Jowhar and Afgoye on average consume about 82 litre diesel per ton, due to tractor ploughing, levelling and furrowing. **Fuel consumption for land preparation in Jowhar and Afgoye is roughly double that for Bay.**

Irrigation

An estimated 24% of farmers in our study sample used **motorised irrigation** for sesame cultivation, though very large differences exist between regions (Figure 6.3). Diesel consumption in case of motorised irrigation is estimated to be 8 – 27 litre diesel per hectare per season, equating to 24.6 – 83.1 litre diesel / ton sesame, mainly depending on the application frequency and efficiency of the diesel engine used.

6.8.2 Transport as minor driver of energy consumption

With an estimated cargo capacity of 20 tons per truck, and 65 litres of diesel per 100km due to difficult infrastructure, topography and state of the vehicles, transporting sesame in Somalia is estimated to consume 3.25 litre / ton / 100km. Thus, transporting sesame from Bay region to Mogadishu for processing and export would consume 9.75 litre diesel / ton sesame, while the same value for Jowhar would be 3.25 litre / ton and 0.975 litre / ton for Afgoye. Thus, depending on the production zone, transporting sesame consumes about 1 – 10 litres diesel / ton sesame.

6.8.3 Processing as driver of energy consumption

Processing for export – Dehulling grains

Practically all sesame that is **exported** outside Somalia is shipped not as sesame oil but as raw sesame grains or **dehulled sesame**. First the grains are cleaned and sorted, including the removal of organic material and destoning. This is followed by sorting based on gravity and often also based on colour. Subsequently, the grains are dehulled and dried, after which they are cleaned and sorted once more before being bagged. All steps mentioned above use electricity, excluding the drying in case of wet hulling which requires a diesel-powered boiler that consumes large amounts of energy. Cleaning and sorting require 5-15 kWh per ton sesame. Wet dehulling requires 45 – 110 kWh per ton sesame, largely due to the high energy demand from drying (30 – 80 kWh per ton). In contrast, dry dehulling only consumes 13 – 23 kWh per ton. Given that major processors are **shifting from wet to dry hulling, the largest source of energy (and water) consumption in the sesame processing process will be removed**. Thus, sesame processing for exports requires roughly 18 – 38 kWh per ton. With 1 litre of diesel being the equivalent of 10 kWh, sesame processing in Somalia for export consumes an equivalent of 1.8 – 3.8 litre of diesel per ton.

Processing for local consumption – Sesame oil

Two main **types of oil milling methods** were identified for the environment analysis: (i) **traditional camel milling** and (ii) **motorised oil milling.** Though camel mills are very rare these days. One camel mill can process 18 litres of sesame oil per day. Most millers are motorised, with the majority having a daily output of 100 – 200 litres of sesame oil per day, and a minority being capable of producing 500 – 1000 litre per day.

The median conversion rate of sesame oil processing in Somalia is 46 litres of sesame oil per 100 kg sesame grains, with a range of 40 – 48 litres per 100 kg. Given the density of sesame oil being 0.92 kg/litre, the **median mass conversion rate is 42 kg sesame oil per 100 kg sesame grains, or 42%** by mass. The range of mass conversion found in our study being 37 – 44 % by mass. Literature on sesame oil processing mentions extraction yields of 38 – 51 % by mass (Piravi-Vanak et al., 2024). Thus, the extraction yields in Somalia fall **within the range mentioned in the literature**, though the higher parts of the range were not observed in Somalia. Thus, we can say that **sesame oil extraction is quite efficient**, though there is still room for improvement. Some millers mentioned higher extraction yields for *Dunyar* (44% by mass) compared to the *Humera* variety (37% by mass). Additionally, millers mentioned that using irrigated sesame also results in higher extraction rates than rainfed sesame, though no numbers were given.

About two-thirds of the motorised oil millers rely on diesel, while the remaining one-third relies on electricity. On average, 16 litres of sesame oil are produced per litre of diesel, with a range of 11 – 23 litres sesame oil

per litre of fuel. This equates to 6 litres of diesel per 100 litre of sesame oil, with a range of 4 – 9 litre diesel / litre sesame oil. Or otherwise stated, this equates to a median of 30.8 litres diesel per ton of sesame grains for oil milling. As no reliable figures could be found on the electricity consumption (kWh) to produce sesame oil, these numbers are not included.

6.8.4 Overview of energy consumption across the value chain

A typical farmer in Bay consumes 52 litres diesel per ton sesame, while a typical farmer in Jowhar consumes 161 – 182 litres diesel per ton and a typical farmer in Afgoye consumes 186 – 265 litres diesel per ton sesame. The main difference between Bay and the other regions comes from using less N-based fertilisers, as well as not levelling and furrowing the land using a tractor. The main difference between Jowhar and Afgoye is due to many farmers in Afgoye using motorised irrigation.

The **major consumers of energy** in the production process are the use of **N-fertilisers** (68 – 80 litre diesel / ton sesame), **land preparation** using tractors (41 – 82 litre diesel / ton sesame) and **irrigation** (41 – 82 litre diesel / ton sesame) if used. P-fertilisers are minor consumers of energy (11 – 20 litre diesel / ton sesame) compared to other inputs.

Transport from farm to Mogadishu (1 – 10 litre diesel / ton sesame) is the smallest consumer of energy together with export processing (1.8 – 3.8 litre diesel / ton sesame). **Thus, practically all energy is consumed in the production phase** of the value chain (52 – 265 litre diesel / ton sesame). However, there are no clear pathways to reduce energy consumption in the production phase. Though energy use efficiency could be improved by improving soil fertility management, as soil amendments are unbalanced.

6.9 Conclusion – Environmental analysis

At landscape level, the direct biodiversity impact of sesame cultivation appears limited. Agriculture occupies a small share of land in the southern riverine zone relative to natural vegetation, and recent land-use conversion within the study sample appears modest. Broader pressures on wooded vegetation are driven more by charcoal production and fuelwood extraction than by agricultural (sesame) expansion. In that sense, **sesame does not** currently appear to be a **significant direct driver of landscape-scale biodiversity loss**.

Sesame is practically always cultivated as a **monoculture**, frequently occupying a **large share of farm**land among those cultivating sesame, and **varietal diversity** is almost **absent**. Dependence on a single locally adapted variety, *Dunyar*, combined with weak seed systems and limited applied varietal research, reduces resilience to pests and climate shocks, which comes with risks.

Water management is the central environmental issue in the value chain. **Irrigation** is the **main driver** of water use, while water use in processing is comparatively minor and is already declining due to the shift from wet to dry dehulling. The main concern is therefore not processing, but field-level water uses and water management efficiency. Irrigation practices are basic, **water management infrastructure** is often severely **deteriorated**, and substantial water losses occur before water reaches the field. This reduces water-use efficiency and weakens the ability to manage both drought and flood risks, thus severely affecting agricultural productivity, but also has an impact on soil erosion, soil degradation and human health. In this respect, the environmental sustainability of the value chain is closely tied to the **rehabilitation and governance of irrigation and flood-control infrastructure** rather than to crop-specific practices alone. In this context, the EU is financing the **JOSP project** which is clearly targeting this crucial challenge.

Sesame productivity has a large impact on the environmental impact of the value chain as the cultivation phase is the major driver of environmental impact, such as energy and water. Sesame **yields in Somalia are low** by African standards, **highly variable between years**, and strongly shaped by climate shocks. In practice, this means that sesame production is severely affected by recurring drought, flooding, pest pressure and

waterlogging. The evidence suggests that **interannual climate variability is a stronger determinant** of production outcomes **than location, farm size or agricultural practices**. This indicates that environmental sustainability is currently limited more by exposure to climatic risk and weak infrastructure than by intensification.

Sesame cultivation in Somalia is not generally input-free as about half of farmers use mineral fertilisers, but **mineral fertiliser application rates are quite low**. Mineral fertiliser application is substantially below agronomic recommendations **for nitrogen and phosphorus**, **while** mineral **potassium inputs are practically absent**. Other nutrients such as **sulphur**, magnesium, zinc, boron and manganese are **not applied**. Additionally**, no use of agricultural lime was observed**. Suboptimal soil amendments likely play an important role in the relatively low sesame yields observed in Somalia due to nutrient imbalances and soil fertility constraints. However, the upside is that fertiliser-driven acidification or eutrophication poses a limited risk. Combined with the limited use of organic inputs in some regions, especially Bay, this raises **concerns about the long-term capacity of the system to maintain soil productivity.** The environmental problem is therefore not overuse of fertilisers, but rather insufficiently balanced soil fertility management.

Human health concerns are most visible in pest control. **Insecticide use is widespread, unsafe handling practices were explicitly reported, and some products used are relatively hazardous**. This is an important negative finding. High dependence on insecticides, weak knowledge of safe use, and limited regulation reduce the environmental sustainability of the value chain and create direct health risks for farmers and rural communities. Farmers are aware of the risks and request more information and training on Integrated Pest Management.

With respect to energy use and fossil resource depletion, the value chain is not highly energy intensive in transport or processing. These stages make relatively small contributions. **Most energy is consumed in production**, especially through **nitrogen fertiliser** use, **tractor**-based land preparation and **motorised irrigation** where present. Energy use is therefore highly uneven across regions: much lower in Bay and substantially higher in Afgoye and Jowhar. This does not indicate an inherently unsustainable value chain.

In conclusion, the Somali sesame value chain's direct contribution to land-cover change, biodiversity loss and fertiliser-related pollution appears limited, yet its sustainability is weakened by inefficient water management, low and unstable yields, poor varietal diversity, imbalanced soil fertility management, and unsafe pesticide use. **The main environmental constraints are therefore linked less to expansion or heavy input use than to sensitivity to climate shocks, weak infrastructure, inefficient water use for irrigation and suboptimal agricultural management practices resulting in relatively low yields.**

7. SYNTHESIS & RECOMMENDATIONS

7.1 Answering the framing questions

The sesame value chain in Somalia is historically significant and central to rural livelihoods, providing income for smallholder farmers, wage labourers, traders, and exporters. It links remote communities to global markets, supporting employment and national foreign exchange earnings. However, social sustainability is hindered by low wages, weak labour protections, outdated tools, limited infrastructure, and entrenched socio-cultural norms. Smallholders, especially women, youth, and displaced populations, face unequal power relations, restricted access to land, inputs, and finance, and vulnerability to price volatility. Addressing structural inequalities, improving labour conditions, resource access, and organisational capacity could transform sesame production into a more equitable, socially sustainable rural development driver.

FQ1. What is the contribution of the Value Chain to economic growth?

Despite the positive value of profitability indicators mentioned above, there are huge inequalities in the distribution of income. The Lorenz curve of the NOP distribution is far from fair distribution line with a corresponding Gini index of 0.5595. In average, 98.93% of the total agents share 48.90% of the total net operating profit implying that lesser that 2% of the total agents share more than 50% of the net operating profit. In considering both net operating profit for direct stakeholders from the VC and wages paid to employees, there are still huge inequalities across the VC operations. Wages are indeed exclusively concentrated on the oil milling operations.

FQ2. Is this economic growth inclusive?

Despite the positive value of profitability indicators mentioned above, there are huge inequalities in the distribution of income. The Lorenz curve of the NOP distribution is far from fair distribution line with a corresponding Gini index of 0.5595. In average, 98.93% of the total agents share 48.90% of the total net operating profit implying that lesser that 2% of the total agents share more than 50% of the net operating profit. In considering both net operating profit for direct stakeholders from the VC and wages paid to employees, there are still huge inequalities across the VC operations. Wages are indeed exclusively concentrated on the oil milling operations.

Vulnerability in the sesame value chain can be understood in terms of sensitivity – the extent to which people and economies depend on sesame – and adaptive capacity – the ability of individuals and socioeconomic systems to anticipate, respond to, and adjust to changes, as well as to minimise, cope with, and recover from their consequences. Based on this approach, a very high proportion of stakeholders in the sesame sub-chains are likely to be vulnerable, not only due to Somalia's challenging edaphic and climatic conditions, but also because of recurrent floods and droughts, which exacerbate risks through hazard events. Somalia is considered one of the most vulnerable countries to climate variations. Absence agricultural research and limited availability or affordable drought-resistant seed varieties have contributed towards farmers' vulnerability to drought incidences (FAO and UNDP, 2024). On top of these environmental vulnerabilities, sesame value-chain actors operate in an often fragile and hostile context, marked by insecurity, weak infrastructure, and political instability, which further constrains their capacity to cope and adapt. There are no platforms within the sesame VC where these issues are discussed and addressed, or advocacy to capacity building can emerge.

Temporary employment is created within oil milling operations. On the 19,073 temporary jobs created within the VC, more than 92% are concentrated in the small et medium oil millers, 7% in the traditional camel oil millers whilst Som Seed Agri only accounts for 0.6%.

FQ3 – Is the sesame value chain in Somalia socially sustainable?

The application of the social sustainability VCA4D methodology to the sesame value chain identified working conditions and living conditions as the domains of greatest concern, scoring moderate-low, with average scores below 2. Land and water rights, food and nutrition security, and gender equality were also scored moderate-low, with average scores around 3. Consequently, the social profile of the value chain is relatively low, highlighting the challenges faced by the majority of its actors across the six domains.

Working conditions in Somalia's sesame value chain are generally not socially acceptable. Despite formal commitments to international labour standards, enforcement is weak. Workers face low wages, poor protections, outdated tools, and limited organisation, with women and children particularly vulnerable. Youth engagement exists but is constrained by limited access to resources. Land and water rights are shaped by conflict and legal pluralism, combining customary, religious, and formal systems. Communal land ownership often excludes women and youth, while increasing competition over resources – especially in riverine areas- intensifies disputes and insecurity. Gender inequality is a major constraint. Women dominate labour-intensive roles but lack access to land, credit, and decision-making power. Some diversification into trading and processing exists, yet heavy workloads and limited mobility persist. Food security remains fragile due to climate shocks, conflict, and reliance on sesame as a cash crop. Limited diversification and poor infrastructure contribute to malnutrition. Social capital is weak, with farmer organisations lacking cohesion and influence. Dependence on intermediaries and short-term NGO interventions limits sustainability. Living conditions are poor: inadequate healthcare, water, sanitation, education, and infrastructure – combined with conflict and displacement – continue to undermine livelihoods and long-term development.

FQ4 – Is the sesame value chain in Somalia environmentally sustainable?

At landscape level, the direct environmental footprint of sesame cultivation appears limited. Agriculture occupies only a small share of land in the southern riverine zone compared to natural vegetation, and sesame expansion does not appear to be a major driver of biodiversity loss. The sector is also relatively low-input compared to many other agricultural systems. Mineral fertiliser application rates are generally low, reducing risks of fertiliser-driven pollution such as acidification or eutrophication. Processing and transport stages of the value chain are also not highly energy intensive. These factors indicate that the Somali sesame value chain currently exerts relatively limited pressure on certain environmental indicators.

Water management is the most important environmental challenge. Irrigation systems are often inefficient and water infrastructure is deteriorated, leading to significant water losses and limited control over floods and droughts. As a result, sesame production remains highly vulnerable to climate shocks. Low and unstable yields further reduce resource-use efficiency, as land, water and energy inputs generate uncertain output. Sesame production is also characterised by monoculture and very limited varietal diversity, which reduces resilience to pests and climate variability.

Soil fertility management represents a concern. Fertiliser application rates are quite far below agronomic recommendations and nutrient applications are imbalanced, with lime, potassium and other nutrients largely absent. While this reduces the risk of nutrient pollution, it may contribute to long-term soil fertility constraints. In addition, widespread insecticide use combined with unsafe handling practices creates human health risks.

Overall, the main environmental risks in the Somali sesame value chain are not linked to excessive intensification, but rather to weak infrastructure, climate vulnerability, limited adaptive capacity and

suboptimal farm management practices. Improving environmental sustainability will therefore depend primarily on strengthening irrigation and flood-control infrastructure, promoting improved soil fertility management, expanding varietal research and seed systems, and strengthening farmer training on integrated pest management and safe pesticide use. These interventions would help improve both environmental performance and the resilience of sesame production systems in Somalia.

7.2 The risk analysis

The sesame value chain in Somalia is exposed to **high price volatility,** driven by a combination of external and internal factors. Globally, price fluctuations are influenced by weather-induced production shocks in major producing countries and shifts in import demand. Domestically, volatility is exacerbated by unstable production linked to climate variability. In addition, the presence of multiple taxation layers—including formal, informal, and conflict-related levies—reduces export competitiveness. These risks are systemic and affect all value chain actors, but particularly smallholder farmers, whose incomes are highly sensitive to both yield and price fluctuations.

Social risks in the sesame value chain are closely linked to **structural vulnerabilities** and **unequal access to resources**. The sector faces a risk of declining attractiveness for younger generations, driven by low returns, high production risks, and limited access to capital and land. At the same time, insecure and inequitable land and water tenure systems remain a major constraint, particularly in regions affected by conflict and displacement. Gender inequalities further exacerbate vulnerability: although women play a central role in production and trade, they face restricted access to land, finance, and decision-making, combined with heavy workloads and exposure to social and economic risks. More broadly, the limited income generated from sesame production, combined with isolation, insecurity, and climate stress, constrains improvements in living conditions, highlighting the persistence of poverty traps within the value chain.

Environmental risks in the sesame value chain are primarily driven by **climate vulnerability and sub-optimal resource management**, rather than excessive intensification. **Water management** represents the most critical constraint: inefficient irrigation systems and deteriorating infrastructure result in high water losses and limited capacity to manage floods and droughts. This significantly increases **production instability** and contributes to land degradation. Low and highly variable yields, which are strongly influenced by interannual climatic variability, further reduce resource-use efficiency and amplify economic risks. In parallel, **inadequate soil fertility management,** characterised by low and imbalanced nutrient application, poses long-term risks to productivity and soil health.

Overall, the risk analysis highlights that the **sustainability of the sesame value chain in Somalia is fundamentally shaped by two interconnected drivers: climate variability and structural inequality**. Climate-related shocks through their effects on yields, water availability, and production stability translate directly into economic volatility and environmental degradation, while also exacerbating food insecurity and livelihood risks. At the same time, unequal access to resources, income, and decision-making power limits the ability of key actors, particularly smallholder farmers, women, and youth, to adapt to these shocks.

7.3 Summing up benefits and negative impacts

Benefits

Economic
The sesame VC is way to diversify the export revenues while the profitability indicators of actors involved in this value chain are clearly positive. Even though, the contribution of the sesame VC to the macroeconomic

aggregate is still limited, investment in agricultural research and extension, and capacity building, improvements in the agricultural markets' information can underpin this sector

Social
The sesame value chain in Somalia has deep historical roots and plays an important role in rural livelihoods and local economies. This highlights not only the crop's socio-cultural significance but also its sustainability and resilience within agricultural livelihood systems. Primarily cultivated as a cash crop, sesame provides essential income to poor rural households, which constitute most actors along the value chain. It also supports rural employment across production, processing, and trading, and contributes to national foreign exchange through exports. It connects remote communities to markets, offers opportunities for value addition, and sustains livelihoods, making it a key driver of rural economic activity.

Environmental
The Somali sesame value chain has a relatively limited direct environmental footprint. Agricultural expansion linked to sesame appears modest at landscape level, and the crop is produced with relatively low levels of external inputs. Fertiliser application rates are generally low, which reduces risks of fertiliser-driven pollution such as acidification and eutrophication. Processing and transport stages are also not highly energy-intensive, with most environmental impacts occurring during the production phase. In addition, ongoing technological changes, such as the shift from wet to dry dehulling, are reducing water and energy use in processing.

Negative impacts

Economic
Sesame production is suffering from un harmonised fiscal regime while conflict groups are controlling areas of production and making investments more insecure. All these factors coupled with unpredictable climate shocks undermine the competitiveness of the commodity.

Social
Sesame production in Somalia faces social challenges including low wages, poor labour conditions, limited access to land, inputs, and finance, gender inequality, and climate-related risks. Price volatility and remoteness reduce income security, while young people often migrate, perpetuating poverty and limiting the sector's potential for socially sustainable rural development.

Environmental
Environmental concerns mainly arise from structural weaknesses in production systems. Irrigation inefficiencies and deteriorated water infrastructure lead to water losses, increased vulnerability to droughts and floods, and associated risks of soil erosion and land degradation. Sesame cultivation is largely based on monoculture with very limited varietal diversity, which reduces resilience to pests and climate shocks. Soil fertility management is imbalanced, with low and incomplete nutrient inputs that may contribute to declining soil productivity over time. In addition, widespread insecticide use combined with unsafe handling practices creates environmental and human health risks. Overall, the main environmental challenges are linked to weak infrastructure, climate vulnerability and suboptimal management practices rather than to excessive intensification.

7.4 Pathways for the sustainable development of the sesame VC

Governance and coordination-driven transformation

This pathway focuses on strengthening **governance as a lever** to address fragmentation, inequality, and inefficiencies across the value chain. Establishing a multi-actor platform, which includes farmers, traders, processors, public authorities, and development partners, might create a structured space for **dialogue,**

coordination, and more collective action. Such a platform could support the harmonisation of the fiscal regime, strengthen market information systems, and facilitate more equitable distribution of value added. For example, this could play an important role in **improving sesame grain quality**, which has a positive effect on the reputation of sesame from Somalia, which might result in higher demand and increased price when exporting.

Improved governance would also enable better integration of formal institutions with customary systems, particularly in relation to land and water management. Strengthening farmer organisations and cooperatives might enhance bargaining power, reduce dependency on intermediaries, and improve access to services. More inclusive governance, meaning ensuring participation of women, youth and vulnerable groups, would help address structural inequalities. Overall, this pathway creates the institutional conditions necessary for coordinated more efficient and useful investments and more inclusive value chain development.

Productivity and resilience-driven transformation

This pathway focuses on addressing the **primary structural constraint of the sesame value chain: extreme climate variability**, particularly recurrent droughts and floods, which drive low and highly variable yields. These risks cannot be effectively managed at farm level alone, but **require large-scale, coordinated investments in water infrastructure and landscape-level management**. Rehabilitation and expansion of irrigation and flood-control systems—such as canals, gates, and drainage networks, particularly along the Shabelle and Juba rivers—are therefore central. Programmes such as the JOSP program illustrate the type of systemic intervention required to stabilise water availability and reduce production volatility.

By reducing the severity and frequency of climate shocks, such investments would create the conditions for more stable and predictable production, thereby improving resource-use efficiency and enabling farmers to benefit from other productivity-enhancing measures. In this context, farm-level improvements such as integrated soil fertility management (ISFM), improved seed use, and integrated pest management (IPM) become more effective once the underlying water-related risks are mitigated. This pathway emphasises that **stabilising the production environment is a prerequisite for sustainable intensification**, improved resource use efficiency and thus reduced environmental impact, improved competitiveness, and reduced vulnerability across the value chain.

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Annexes

Annex I – Agendas of workshops in Nairobi

Training agenda – Nairobi – 20 to 31 October 2025

DAY 1 OCTOBER 20TH – MONDAY	TIME	WHO
Focus: **Team presentation – ice breaker**	9:00 – 10:00	Margarida + all
Objectives: Getting to know the team and brainstorming		
Focus: **Step 1: Setting the scene for the sesame VC in Somalia**	10:00 – 11:00	Nicodème
What do we know about sesame in Somalia from the preparatory *literature review* and knowledge exchange	10:00 – 13:00	All (roundtable)
Lunch time 13:00 – 14:00		
Focus: Preparation of meeting with EUD	14:00 – 17:00	All
Objectives: Identify the most important points for the meeting with the EUD		
Fieldwork in *sesame regions* (calendar, itinerary, transportation and other details)	14:00 – 14:00	All
List of *stakeholders*	14:00 – 15:00	All
Security issues/ security guarantees	15:00 – 16:00	All
Validation with Ismail – remotely		All + Ismail Kukay
Power – point to be presented on 21th	17:00 – 17:30	Nicodème + Margarida + Ieben
DAY 2 OCTOBER 21TH TUESDAY	**TIME**	**WHO**
Meeting with EUD	10:30 – 12:30	Nicodème + All + Ismail
Lunch time 13:00 – 14:00		
Focus: Recap of meeting with EUD	14:30 – 15:30	All
Step 2: Fieldwork final planning following EUD meeting	15:30 – 17:00	All
(i)Decide on regions to visit, sample size, calendar	15:30 – 15:00	All
(ii)Draft preliminary budget (transport, hotels, frame?? transport, …)	15:00 –17:00	All
DAY 3 OCTOBER 22TH – WEDNESDAY	**TIME**	**WHO**
Focus: **Step 3: The VCA4D model – the 4 framing questions**	09:00-12:00	Nicodème
Observations: Presentation of the four framing questions and its intersectionality		
FQ1. What is the contribution of the Value Chain to economic growth?	09:00 – 09:30	Nicodème
FQ2. Is this economic growth inclusive?	09:30 – 10:00	Nicodème + Margarida
FQ3. Is the sesame value chain in Somalia socially sustainable?	10:00 – 10:30	Margarida
FQ4. Is the sesame value chain in Somalia environmentally sustainable?	10:30 – 11:00	Ieben
Risk analysis and recommendations (Video synthesis and recommendations)	11:00 – 11:30	Margarida
Questions and discussion	11:30–13:00	All

Lunch time		13:00 – 14:00
Focus: **Step 4: The functional analysis**	14:00 – 17:00	
1.The main features of the value chain	14:00 –15:00	All
2.The main technical processes and practises	15:00 –17:00	All
DAY 4 OCTOBER 23RD – THURSDAY	**TIME**	**WHO**
Focus: **Interviews with stakeholders in Nairobi – Check-lists**	9:00 – 12:00	All
Objectives: Preparation of the interviews– Kenyan sesame exporter		
Preparation of interviews checklist	9:00 – 13:00	All
Lunch time 13:00– 14:00		
Interviews with Brian	14:00 – 19:00	All
DAY 5 OCTOBER 24TH – FRIDAY	**TIME**	**WHO**
Review of data collected on Day 4	9:00 – 13:00	All
Lunch time 13:00 – 14:00		
3.The VC organisation and governance	14:00 –16:00	All
DAY 6 OCTOBER 27TH – MONDAY	**TIME**	**WHO**
Focus**: Step 5: Review of stakeholders' list**	9:00- 13:00	All + Ismael
Objectives: Prepare fieldwork mission		
Identification of list of stakeholders per region	9:00-13:00	Nicodème + Abdinasir
Lunch time 13:00 – 14:00		
Focus**: Step 6: Economic, Social and Environment analysis' – working in pairs**	14:00- 17:00	All + Ismail
Objectives: Develop Somali capacities to support data collection during fieldwork		
Economic analysis	14:00-17:00	Nicodème + Abdinasir
Social analysis – Domains 1 and 2	14:00-17:00	Margarida + Abdullahi
Environmental analysis	14:00-17:00	Ieben + Ibrahim
DAY 7 OCTOBER 28TH – TUESDAY	**TIME**	**WHO**
Focus: – Kick-off meeting with EUD + Ministries of Somalia	10:00 – 11:00	All + EUD + Mustafe
Recap of meeting in EUD – Action points	12:00 – 12:30	All
Update of itinerary + list of stakeholders	12:30 – 13:00	Somali team
Lunch time 13:00 – 14:00		
Economic analysis	14:00-17:00	Nicodème + Abdinasir
Social analysis – Domains 3 and 4	14:00-17:00	Margarida + Abdullahi
Environment analysis+ stakeholders prioritisation	14:00-17:00	Ieben + Ibrahim
DAY 8 OCTOBER 29TH – WEDNESDAY	**TIME**	**WHO**
Focus: **Step 7: Economic, Social and Environment analysis' – working in pairs**	9:00 – 17:00	All
Objectives: Develop Somali colleagues' capacities to support data collection during fieldwork		
Economic analysis+ stakeholders prioritisation	9:00 – 12:00	Nicodème + Abdinasir
Social analysis – Domains 5 and 6 + stakeholders prioritisation	9:00 – 12:00	Margarida + Abdullahi
Environment analysis	9:00 – 12:00	Ieben + Ibrahim
Lunch time 13:00 – 14:00		
Focus: Fieldwork mission planning – fieldwork materials		

Economic analysis	14:00 – 17:00	Nicodème + Abdinasir
Social analysis – fieldwork checklists	14:00 – 17:00	Margarida + Abdullahi
Environment analysis	14:00 – 17:00	Ieben + Ibrahim
DAY 9 OCTOBER 30TH – THURSDAY	**TIME**	**WHO**
Focus: Fieldwork mission planning (II) – checklists	9:00 – 17:00	All
Objectives: to provide the Somali colleagues with materials to support the data collection – practical exercise		
Economic analysis	9:00 – 12:00	Nicodème + Abdinasir
Social analysis	9:00 – 12:00	Margarida + Abdullahi
Environment analysis	9:00 – 12:00	Ieben + Ibrahim
Lunch time 13:00 – 14:00		
Focus: **Step 8: Fieldwork mission planning (II) – fieldwork materials – finalisation and harmonisation of the three analyses**		
Economic analysis	14:00 – 17:00	Nicodème + Abdinasir
Social analysis	14:00 – 17:00	Margarida + Abdullahi
Environment analysis	14:00 – 17:00	Ieben + Ibrahim
DAY 10 OCTOBER 31TH – FRIDAY	**TIME**	**WHO**
Focus: **Step 9: Fieldwork final summary**	9:00 – 13:00	All
Wrap-up discussion	9:00 – 10:00	All
Workshop summary and participants' evaluation	10:00 – 13:00	All

Agenda for Nairobi – VC Sesame Somalia
Venue: Suiss-Belinn Hotel, Nairobi
Date: 19-24 January 2026

DATE	TIME	PERSON IN CHARGE
Monday 19/1		
Present and validate agenda for the 19-24 January week	9:00 – 9:30	all
Set and discuss objectives and outputs for the week + timeline after Nairobi	9:30 – 10:15	all
Brainstorming about the study (incl. typology and potential subs chains?)	10:15 – 10:30	all
Short break	10:30 – 10:45	
Presentation of the second field data collection mission	10:45-11:00	all
Integration of data from 2nd fieldwork mission	11:00 – 1:00	Pairs
Lunch break	*1:00 – 2:00*	
Integration of data from 2nd fieldwork mission	2:00 – 4:00 PM	Pairs
Short break	*04:00 – 04:30*	
Integration of data from 2nd fieldwork mission	4:30 – 6:00 PM	Pairs
Tuesday 20/1		
VC functioning and data analysis	9:00 – 10:30	All
Short break	10:30 – 10:45	
VC functioning and data analysis	10h45-1:00	All
Lunch break	*1:00 – 2:00*	
Functional analysis	2:00 – 4:30	Pairs
Short break	*04:00 – 04:30*	
Functional analysis (Con't)	4:30 – 6:00	Pairs
Wednesday 21/1		
Presentations of preliminary findings per thematic	9:00 – 10:30	all
Short break	10:30 – 10:45	
Presentations of preliminary findings per thematic	10: 45 – 1: 00	all
Outline of the final report	2:00 – 4:00	all
Short break	4:00 – 4:30	
Outline of the final report	4:30 – 5:30	all
Thursday 22/1		
Data analysis & drafting	9:00 – 10:30	Pairs
Video call with Som Seed Agri	10:30-12:00	all
Data analysis & drafting	12:00 – 1:00	Pairs
Lunch break	*1:00 – 2:00*	
Summarise key preliminary findings and risk assessment	4:30 – 6:00	all

Friday 23/1		
Trans disciplinary understanding around the VC	9:00 – 10:30	all
Short break	10:30 – 10:45	
Key recommendations from the VC analysis	10:45 – 12:45	all
Discuss next steps: draft report	12:45 – 1:00	all
Lunch break	*01:00 – 02:00*	
Next steps: draft report	*2:00 – 4:00*	The 3 international experts
Trans disciplinary understanding around the VC	*4:00 – 6:00*	The 3 international experts
Week of 26/1		
EUD video call	Thursday 29, 3:00 pm (Mogadishu time)	all

Annex II – Stakeholders prioritised for 1st Fieldwork mission in Somalia (per region)

REGION	LOCATION	MAIN CATEGORY	SUB-CATEGORY	NAME	COMMENTS	PRIORITY LEVEL		
Bay						**Environment**	**Social**	**Economic**
Bay	Baidoa	Farmers	Average size	Various		Covered	Covered	Covered
			Large	NA		NA	NA	NA
			Women				Covered	Low
		Formal	Employees large farms/ enterprises				covered	Low
		Input suppliers	Seed producers	CSET		Met in Mogadishu	Low	Covered
			Seed producers	Bay Agro Seed Company		Met in Mogadishu	Low	NA
			Retailers in Bazaar		Selling seed for planting to farmers	Low	Low	High
			Agri input shops (fertilisers, pesticides, …)	NA		Low	Low	Low
		Millers	Traditional camel	To identify	Not available	Low	NA	NA
			Small-scale machines			Covered	covered	Covered
			Medium scale machines	Not available		NA	NA	NA
		Local organisations	Village leaders			Low	covered	
			Farmer coops	Bay Farmer Cooperative		Covered	Covered	Low
			NGO	To identify			To be covered	Low
			CBO			NA	NA	Low
		International organisations		FAO > FSNAU		Not present	Not present	No present
		Credit	Microfinance	Maybe only in Mogadishu? To investigate		Low	NA	Low
				VSLA – Village Saving and			covered	Low

				Loan Associations				
		Market	Retailers in Bazaar	NA	Grains, seeds, oil and sweets	Low	covered	Covered
			Middlemen/women (Dilaal)			Low	NA	Covered
				To identify	More market access	Low	NA	Low
		Government	State MoAI	-Director General – - Senior Staff-		Covered	Covered	Low
			State MoEnv	Deputy Minister-		Covered	Low	Low
			Women and Women Rights (Hirshabelle State)				NA	Low
			State MoWater (&Energy)			Medium	Low	Low
		University	Zamzam	To identify		Covered	Low	Medium
Middle Shabelle	Jowhar	Farmers	Small Scale Farmers	NA		Covered	Covered	Covered
			Medium Scale Farmers	NA		Covered	Covered	Covered
			Large Scale Farmers	Darasalam agribusiness		Covered	Covered	Covered
			XL	Moumin group		Covered	Covered	Covered
		Input suppliers	Seed producers	**CSET**		Covered	NA	Covered
			Retailers in Bazaar		Selling seed for planting to farmers	Low	covered	High
			Agri input shops (fertilisers, pesticides, …)	NA		Low	NA	NA
		Millers	Traditional camel	To identify		NA	NA	NA
			Small scale machines			Covered	NA	Covered
			Medium scale machines	Not available		NA	NA	NA
		Local organisations	Village leaders			Low	Covered	Low
			Farmer coops	Not available		NA	NA	Low
			NGO	To identify	Business, train farmers, …	Medium	Covered	Low

				Experimental plots	No demonstration plots exist Jowhar	Non existing		
			CBO	Water committees		Covered	covered	Low
		International organisations		FAO/EUD irrigation project	In Mogadishu or Jowhar?	Outside the city		Low
				FAO > FSNAU		Not present	Not present	Not present
		Credit	Microfinance	Maybe only in Mogadishu? To investigate		Low	NA	Low
			Middlemen (Dilaal)			Low	NA	Covered
			Brokers	Middlemen identified (only)	More market access	Low	NA	Middlemen-covered
		Government	State MoAI			Covered	covered	Medium
			State MoEnv			Not present	NA	Low
			State MoWater (&Energy)			NA	NA	Low
		University	Zamzam	To identify		Covered		Medium
Lower Shabelle	Afgoye	Farmers	Small scale	various		Covered	Covered	Covered
			Large			Covered	Covered	Covered
		Input suppliers	Seed producers	Dar es Salaam seed company		Covered	Covered	Covered
			Retailers in Bazaar	Met in Jowhar	Selling seed for planting to farmers	Low	NA	Met in Jowahar
			Agri input shops (fertilisers, pesticides, ...)	NA		Covered	NA	Covered
		Millers	Traditional camel	To identify		NA	NA	NA
			Small-scale machines			Covered	NA	Covered
			Medium scale machines	Not available?		Low	NA	NA
		Local organisations	Village leaders			Low	Covered	Low

			Farmer coops	NA		Medium	covered	Low
			NGO	To identify			To be covered	Low
			CBO		No response	Medium	NA	Low
				Water committee		Covered	NA	Low
			Farmer association	Afgoye Balcad Awdhegele		Medium	covered	
		International organisations		USAID / FAO experimental plots?		Non-existent?		Low
				FAO > FSNAU		Not the present?		Low
		Credit	Microfinance	Maybe only in Mogadishu? To investigate		Low	NA	Low
			Middlemen (Dilaal)	To identify		Low	NA	Met in Jowhar
			Brokers	Only middlemen	More market access	Low	NA	NA
		University	Zamzam	To identify	*Plant pathology lab*	Met in Bay and Jowhar	Low	Medium
					Experimental plots	Non-existent?		
Mogadishu	Mogadishu	Government	Seed quality (imported), phytosanitary export requirement,	SARIS		Covered	Low	Covered
			Statistics & standards	**SOBS**	Somali Bureau of Standards	Medium	Low	Waiting for response
			Fed. MoFin	**SNBS**	SNBS (External trade data)	Low	NA	Low
			Fed. MoAI			Covered	Covered	Covered
			Fed. MoEnv			NA-as the top management went to COP30	NA	Low
			Fed. MoWater (&Energy)			NA	NA	NA

			Seedbanks			Non-existent?	NA	Low
		Farmer coop	National Farmer Cooperative	UQIB		NA	Covered	Medium
		Credit	Microfinance	To identify		Low	NA	Low
		International institutions	FAO > FSNAU	Email Massimo & report		Not present	NA	Low
			FAO > SWALIM			Not Present	NA	Low
			FAO > GEEL?			Not present?		Low
		Processing	Oil millers	(Large miller)	Identify different typologies — > Select KI per typology	Covered	covered	Covered
			Exporter of sesame	Som Seed Agri	Ahmed Farah	Covered	Covered	Covered
		Agri-business	Production, processing, trade, export	Danwadaag company	Many farmers in Middle Shabelle	Covered	Covered	Low
			Seeds	SATG (Somali Agricultural Technical Group)	Plant breeder (Ismail knows)	NA, the team contacted but not responded	NA	Low
			Production, processing, trade, export	Moumin group/ Group of Companies	No response	Covered	Covered	Covered
		Market	Retailers in Bazaar			Low	NA	Covered
		University	Zamzam			Met in Jowhar and Bay	Low	Medium

Note: for privacy reasons the names of the participants have been removed.

Annex III – Stakeholders prioritised for 2nd field mission in Somalia (per region)

REGION	LOCATION	MAIN CATEGORY	SUB-CATEGORY	NAME	COMMENTS	PRIORITY LEVEL			STATUS	DATE	NOTES
						Environment	Social	Economic			
Mogadishu		Statistics	Statistics & standards	Ministry of Finance + MoAI	Somali Bureau of Standards				Pending		Important to make a formal contact through email + introduction letter from the EUD. Still waiting from data from the MoAi. Isamel contacted by phone (SNBS)
Mogadishu		Credit	Microfinance	To identify	Who is entitled; which conditions, gender		x		Covered		Informant has contact of an inst that provides credit to farmers

Mogadishu		International institutions	FAO	FAO / FSNAU / SWALIM / GEEL?	irrigation rehabilitation	x	x		Not covered		Introduction letter (?)
		Ministry of Finances	Revenue and Customs Dept		Manage the custom offices				Covered		Introduction letter to Ministry of Finances (head of Dept)
Mogadishu		Chamber of Commerce	Chamber of Commerce		National and regional production data, if it exists		x	x	Covered		Introduction letter to Ministry of Finances (head of Dept)
Mogadishu		Millers	Traditional camel	Near Mogadishu	It seems that this traditional oil miller is processing a small volume of sesame grain. We still need to capture its ((sesame grain) market share to set up the VC representation	x	x	x	Covered		Considered organic, pure, more expensive. Possibility to increase?

Mogadishu			Small-scale machines		Mills processing capacity, the plant piled yield, etc. We are not sure whether the oil millers already covered by the first data collection are representative of the sesame processing sub-sector. Working conditions		x	x	Covered		Details still needed for economic and social analysis
Mogadishu			Medium scale machines	Chinese and Japanese machines			x	x	Covered in the first mission		Details still needed for economic and social analysis
			Industrial size processing (Som Seed Agri)			x	x	x	covered	14.01 10am	Abdullahi to make contact with workers
Mogadishu		Farmers from Afgoye	Specially, medium (M) and very large (XL) farmers, if they exist. Youth/ attractiveness		They can be more than clients and their market shares and plausible different prices at which sesame grain is sold. It will be helpful to	x	x	x	Covered		

					fix these relationships across the VC with additional farmers						
Mogadishu		Industrial processing facilities		A processing plant owned by a woman	Market conditions. Working conditions		x	x	Covered		
		Mumim		Economic data to be completed					Covered		
		Exporters		To collect some of the costs missing					Covered		
		Agri-shop		Pictures of pesticides					Covered		
		Woman middle-woman					x		Confirmed		Contacted by phone
		Woman that owns a milling machine					x		Confirmed		Contacted by phone
		Youth farmers	Specially, medium (M) and very large (XL) farmers, if they exist. Youth/ attractiveness				x		Covered		Abdullahi

Annex IV – List of stakeholders interviewed (per location)

1st Mission

S NO.	SEX	LOCATION	ROLE
1	M	Afgoye	Village Leader
2	F	Afgoye	Farmer
3	F	Baidoa	Farmer
4	F	Jowhar	Farmer
5	F	Jowhar	Farmer
6	M	Jowhar	Farmer
7	F	Jowhar	Farmer
8	F	Jowhar	Farmer
9	M	Jowhar	Farmer
10	M	Jowhar	Middleman
11	M	Jowhar	Farmer
12	M	Baidoa	Chairperson cooperative
13	F	Baidoa	Farmer
14	F	Baidoa	Farmer
15	F	Baidoa	Farmer
16	F	Afgoye	Large Scale farmer/Exporter
17	F	Baidoa	Farmer
18	M	Jowhar	Village Leader
19	M	Baidoa	Village Leader
20	M	Afgoye	Farmer
21	M	Afgoye	Farmer
22	M	Afgoye	Farmer
23	M	Afgoye	Farmer
24	M	Afgoye	Farmer
25	F	Afgoye	Farmer
26	F	Afgoye	Farmer
27	M	Afgoye	Farmer
28	M	Afgoye	Farmer
29	M	Afgoye	Farmer
30	M	Afgoye	Farmer
31	F	Afgoye	Farmer
32	F	Afgoye	Farmer
33	M	Mogadishu	MoAI
34	M	Mogadishu	CSET
35	F	Mogadishu	SARIS

36	M	Mogadishu	Miller
37	M	Mogadishu	Sesame Exported and large miller
38	M	Mogadishu	Farmer
39	M	Mogadishu	Large scale farmer/Exporter
40	M	Mogadishu	Wholesaler
41	M	Mogadishu	Large scale farmer/Exporter
42	M	Mogadishu	Miller
43	M	Mogadishu	Miller
44	M	Mogadishu	Middleman
45	M	Jowhar	Farmer
46	M	Jowhar	Farmer
47	F	Jowhar	Farmer
48	M	Jowhar	Farmer
49	M	Jowhar	Water Committee
50	M	Jowhar	Agro-Input Shop
51	M	Jowhar	Water Committee
52	M	Jowhar	Miller
53	F	Jowhar	Farmer
54	F	Jowhar	Retailer
55	M	Jowhar	Miller
56	F	Jowhar	Retailer
57	M	Jowhar	Farmer
58	M	Jowhar	Farmer
59	F	Jowhar	Farmer
60	F	Baidoa	Wholesaler
61	F	Baidoa	Middlewomen
62	M	Baidoa	Farmer
63	M	Baidoa	Farmer
64	M	Baidoa	Farmer
65	M	Baidoa	Farmer
66	F	Baidoa	Miller
67	F	Baidoa	Retailer
68	F	Baidoa	MoAI in Southwest
69	F	Mogadishu	MoAI-FGS
70	F	Jowhar	MoAi-Hirshabelle
71	M	Afgoye	Miller
72	M	Afgoye	Agrochemical Shop
73	M	Jowhar	Agrochemical Shop
74	M	Mogadishu	Miller
75	M	Mogadishu	University of Zamzam

76	M	Baidoa	Farmer

2nd Mission

The list of Actors Met in the Second Mission
Location: Mogadishu

NO.	SEX	CATEGORY	SCALE	COMMENT
1	Male	Farmer	Medium	
2	Male	Farmer		
3	Male	Farmer		
4	Male	Farmer		
5	Male	Farmer		
6	Male	Agrochemical shop	Agro input supplier	
7	Male	Dean of Agricultural Faculty of Zamzam University		There is no pathology laboratory, but they have a basic laboratory, and no sesame studies are being carried out by the University
8	Male	Traditional Miller		This miller was using camel driven equipment
9	Male	Som Seed Agri		The target was to know more about sesame processing machines.
10	Male	SNBS	Gov. agency	Contacted through emails. Responsive but still waiting to share the data
11	Male	Revenue Directorate	Gov. Agency	Contacted through email and WhatsApp – but he responded through WhatsApp.
12	Male	Hogaan Microfinance	Finance agency	He gave us some data and participated the MFI data collection
13	Female	Bulaal Development Initiative	Finance agency	She gave us a data and participated the MFI data collection
14	Male	Horseed Microfinance and Bulsho SACCO	Finance agency	He gives us a data and participated the MFI data collection
15	Male	Danwadaag Cooperative	Producer and Exporter	Contacted through a phone call – Economic Analysis.
16	Male	Machine Miller	Oil middle processor – Kaaraan district	Answered some questions but not deep information because of trust issues – and he's not educated person to understand the purpose of the study

***Note**: the farmers have been transported from Afgoye and met in Mogadishu for security reasons.*

Annex V – Social Profile Questionnaire

Value chain:	*sesame*	Country:	*Somalia*	Date Last Modification:	20/01/2026	Explanations
Question		**Source**	**Score level**	**Count**	**Comments**	
1. WORKING CONDITIONS						
1.1 Respect of labour rights						
1.1.1 To what extent do companies involved in the value chain respect the standards elaborated in the 8 fundamental ILO international labour conventions and in the ICESCR and ICCPR?			Moderate/Low	2	*Government of Somalia signed ILO principles.* *National agreements are not consistent with the practical enforcement of the principles.* *If they have their international partners.* *Most of them apply the government legislation.* *Each company has a human resources department with human resources policy.* *The practical aspects are the problem.*	
1.1.2 Is freedom of association allowed and effective (collective bargaining)?			Moderate/Low	2	*No there is no workers' organisation at the level of companies.* *The bargaining becomes less effective if you go to smaller enterprises.* *There is no minimum wage.*	
1.1.3 To what extent do workers benefit from enforceable and fair contracts			n/a	n/a	*There are no formal contracts.* *No governmental organisation engaged in any kind of regulation.* *Companies with international scope, or acting regionally (medium size) may have better conditions.*	
1.1.4 To what extent are risks of forced labour in any segment of the value chain minimised?			n/a	n/a	*It doesn't exist. No one can work in Somalia without a payment.* *Even children are paid.*	
1.1.5 To what extent are any risks of discrimination in employment for specific categories of the population minimised?			Moderate/Low	2	*In the last 10 years, there is a change of mindset. Women, people with special need; vulnerable (dislocated people). Most of the tasks in sesame are physically demanding so farmers will not respect, but companies yes.*	
		Average:	**Moderate/Low**	**2,00**	**2,00**	**Final:** **Moderate/Low** **2,00** ***Justification if adjustment of the score level = …***
1.2 Child Labour						

1.2.1 Degree of school attendance in case children are working (in any segment of the value chain)?		Moderate/Low	2	*Child labour is a serious issue in sesame production. Most are paid. They support their families. The education system is weak. Dislocated children are more vulnerable and compelled to be abused.*						Cf: Guidance
1.2.2 Are children protected from exposure to harmful jobs?		Not at all	1	*Activities: Weeding, taking care that animals do not trespass = scarecrows, Threshing, cleaning, sieving. These activities may be harmful. Children /hawking (carrying the cakes and sweets to the markets). They are not protected because there are no government structures.*						Cf: Guidance
	Average:	**Moderate/Low**	**1,50**	**1,50**		**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***	
1.3 Job safety										
1.3.1 Degree of protection from accidents and health damages (in any segment of the value chain)?		Not at all	1	*There are no PPE. Accidents happen. Farmers not aware of chemical risks.*						
	Average:	**Not at all**	**1,00**	**1,00**		**Final:**	**Not at all**	**1,00**	***Justification if adjustment of the score level = …***	
1.4 Attractiveness										
1.4.1 To what extent are remunerations in accordance with local standards?		Not at all	1	*There is no minimum wage. Oral agreement no negotiation. In some places (Jowhar) there are fixed prices agreed by the village committees*						Cf: Guidance
1.4.2 Are conditions of activities attractive for youth?		Moderate/Low	2	*Not very much, but it gives them a living. Yes, but they have to invest capital. They will be more willing to engage in sesame VC as entrepreneurs*						
	Average:	**Moderate/Low**	**1,50**	**1,50**		**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***	
2. LAND & WATER RIGHTS										
2.1 Equity and security of land and water tenure										Cf: Guidance

2.1.1 Does the prevailing land and water tenure system ensure equitable and secure access to land for actors in the VC, particularly those from vulnerable groups?		Moderate/Low	2	*There are conflicts: traditional livestock farmers decide to invest in agricultural crops; the collective grazing areas become private lands for agriculture; lease disagreement (products or payment).* *Women with low access to land.* *Marginalised groups = if you don't belong to the clan (lineage).* *In sesame there is no restrictions. There might happen in other areas.*						Cf: Guidance
2.1.2 To what extent do VC operations in a given land and water tenure system favour good environmental practises?		Moderate/Low	2	*No control of deforestation. Land may be abandoned. Some land is empty.* *In some villages there will be some rules, they are aware of the risks.* *Conflicts. Some villages introduced cutting of trees.* *Elderlies do not have knowledge about environment. Forest cuts for the charcoal.*						
2.1.3 Does government policy towards land and water tenure in the VC favour equity, tenure security favourable to sustainable development approaches?		Not at all	1	*There used to be rules before the collapse of the government. These were old measures. Yet, big farmers may expand their land (private companies) without any government regulation. For the last 1991-2010 years jungle law. After 2010 there is gradually but still no enforcement related to land.*						
2.1.4 Do the public institutions act to prevent and manage tenure disputes, violent conflicts and corruption related to the VC operations?		Substantial	3	*Yes. Oral information. There is no title deed. They rely on former documentation. Elders are invited to take position.*						
2.1.5 In the case of group, communal or common land, do all members of the community have the right to take part in decision-making on land-use?		n/a	n/a	*It doesn't exist. There is no communal land.*						
	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = ...***	
2.2 Respect of Water rights										
2.2.1 Do existing systems of water distribution promote equitable and secure rights to water for actors of the VC, particularly for those from vulnerable groups?		Not at all	1	*Water scarcity may bring problems. Quite individualistic.* *Distortion of irrigation systems.* *Irrigation systems damaged.* If you don't have access river no one will assist you. *There also canals: primary (directly from the river) and secondary canals. There are more conflicts when the river level goes down. Those that access directly*						

				have more benefits and less conflicts. Villagers are asked to look after the irrigation canals. If they feel they are not benefiting there will be conflicts.						
2.2.2 Do existing systems of water distribution promote sustainable use of water?		Substantial	3	*There are agreements with village leaders along the canals. Secondary canals are open or close as for the agreement between villagers. The Water Village Committees play an important role.*						
2.2.3 Does government policy towards water distribution in the VC favour equity and environmental sustainability?		Moderate/Low	2	*There is no government policy. Water distribution in irrigated areas is dealt with the communities themselves with the support of NGO. There are conflicts around water distribution. The canal systems are usually characterised by unfair water distribution with the farmers upstream getting more water.*						Cf: Guidance
	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
VGGT compliant Large-Scale Land Acquisition										
2.3.1 Do government departments and agencies, companies and other institutions involved in the VC safeguard legitimate tenure rights against threats and infringements and provide access to justice where requested?		Not at all	1	*While there are some efforts and localised improvements, Somalia's institutions currently provide uneven and insufficient protection of legitimate tenure rights and limited access to justice, especially in value-chain-related land and resource disputes.*						Cf: Guidance
2.3.2 Do stakeholders in the VC including farmers have access to information about their rights in cases of potential LSLA and to information on specific planned LSLAs that affect them?		Moderate/Low	2	*While some information may be available through local leaders, NGOs, or civil society organisations, systematic, transparent, and rights-based information sharing related to LSLAs in the sesame VC is largely lacking. As a result, farmers' ability to engage meaningfully in decision-making or protect their tenure rights remains limited.*						
2.3.3 Do affected groups participate in decision-making on LSLA and is the principle of Free, Prior and Informed Consent observed?		n/a	n/a	*While Somalia's sesame production involves some commercial expansion and land purchase by larger actors, there is no clear evidence from major land deal databases or systematic LSLA records showing formal large-scale land acquisition projects specifically for sesame. Instead, most land use shifts occur through informal markets, medium-scale purchases, or customary arrangements rather than formal LSLAs as defined in global monitoring frameworks.*						
2.3.4 Where expropriation or disruption of livelihoods is considered justified, is a system for ensuring fair and prompt compensation in place (in accordance with the national law and publicly acknowledged as being fair)?		n/a	n/a	*While Somalia's sesame production involves some commercial expansion and land purchase by larger actors, there is no clear evidence from major land deal databases or systematic LSLA records showing formal large-scale land acquisition projects specifically for sesame. Instead, most land use shifts occur through informal markets, medium-scale purchases, or customary arrangements rather than formal LSLAs as defined in global monitoring frameworks.*						

	Average:	**Moderate**	**1,50**	**1,50**	**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***	
3. GENDER EQUALITY									
3.1 Economic activities									
3.1.1 Are risks of women being excluded from certain segments of the value chain minimised?		Substantial	3	*There is greater awareness of the need for women empowerment. Some NGOs are playing an important role. The larger companies are employing women in similar conditions as men. In the production activities when they have access to resources the risks are minimised. They are playing an important role in small businesses traders, middlewoman, small millers. They don't have the capacity to reach export levels.*					Cf: Guidance
3.1.2 To what extent are women active in the value chain (as producers, processors, workers, traders…)?		Substantial	3	*Women are mostly engaged in the production tasks; they play diverse roles. They are more active than men in the retailing process. There are no cultural restrictions to women entrepreneurship yet the lack of access to land and to other resources who restrict their capacity to generate income. Also, women educational opportunities are very limited. This is not a cultural restriction is more about access to resources and economic circumstances.*					
	Average:	**Substantial**	**3,00**	**3,00**	**Final:**	**Substantial**	**3,00**	***Justification if adjustment of the score level = …***	
3.2 Access to resources and services									
3.2.1 Do women have ownership of assets (other than land)?		Moderate/Low	2	*Women in sesame production have less access to resources such as seeds, better agriculture practices, training.*					
3.2.2 Do women have equal land rights as men?		Moderate/Low	2	*Men are dominant in what land is concerned. No, access to land is what makes women more vulnerable. They have an important role to play in sesame production, but not as landowners. Yet some women inherited land or are widows are they accepted as landowners by the community. When women go to the elderly they will ask* where is your husband?					
3.2.3 Do women have access to credit?		Moderate/Low	2	*They have access to credit if they do not have access to land. Microfinance institutions are profit oriented. Yet women may be considered more reliable.* If you bring your wife, I will facilitate the credit.					
3.2.4 Do women have access to other services (extension services, inputs…)?		Moderate/Low	2	*Women in sesame production have less access to resources such as seeds, better agriculture practices, training and credit.*					

	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
3.3 Decision making										
3.3.1 To what extent do women take part in the decisions related to production?		Moderate/Low	2	*It depends on who is the head of the family. If she is the head of the family, she will go to the community discussions.*						
3.3.2 To what extent are women autonomous in the organisation of their work?		Moderate/Low	2	*They are more autonomous in trade than in production. Some do both (faming and retailing). If they are middle-women or millers there autonomous, but there are few millers. At the small-scale level there are middle-women their territorial scope is restricted. Some need a multiple source of income for food security,* I never used to have a good market for my products, *they prefer to have multiple tasks.*						
3.3.3 Do women have control over income?		Substantial	3	*They tend to have control over their income if they own the business. In the hard-to-reach areas such as the rain-fed areas there is less awareness.*						
3.3.4 Do women earn independent income?		Substantial	3	*They earn independent income as traders in local markets. There are also middle-woman.*						
3.2.5 Do women take part in decisions on the purchase, sale or transfer of assets?		Substantial	3	*They tend to have control over their income if they own the business.*						
	Average:	**Substantial**	**2,60**	**2,60**		**Final:**	**Substantial**	**2,60**	***Justification if adjustment of the score level = …***	
3.4 Leadership and empowerment										
3.4.1 Are women members of groups, trade unions, farmers' organisations?		Moderate/Low	2	*Yes. Mostly they are in the farmers' cooperative, they participate in community organisations VDCs but as cultural/ religious leaders.*						
3.4.2 Do women have leadership positions within the organisations they are part of?		Moderate/Low	2	*Some women are even charismatic but normally are more educated than the average. When it comes to the number of individuals with territorial power, men are dominant.*						
3.4.3 Do women have the power to influence services, territorial power and policy decision making?		Not at all	1	*Very minimal or no. Culturally this not possible.*						
3.4.4 Do women speak in public?		Moderate/Low	2	*They may speak but their voice is not counted and considered. Yet it depends which role they are playing.*						

	Average:	**Moderate**	**1,75**	**1,75**		**Final:**	**Moderate/Low**	**1,75**	***Justification if adjustment of the score level = …***	
3.5 Hardship and division of labour										
3.5.1 To what extent are the overall work loads of men and women equal (including domestic work and child care)?		Not at all	1	*Women work more hours than men. There are no day-care facilities for children. They allocate some land for food crop; it depends on demand.*						
3.5.2 Are risks of women being subject to strenuous work minimised (e.g., using labour saving technologies…)?		Not at all	1	*Men are engaged in more physical tasks. If there is access to machinery women will not benefit as much as men.*						
	Average:	**Not at all**	**1,00**	**1,00**		**Final:**	**Not at all**	**1,00**	***Justification if adjustment of the score level = …***	
4. FOOD AND NUTRITION SECURITY										Cf: Guidance
4.1 Availability of food										
4.1.1 Does the local production of food increase?		Moderate/Low	2	*Yes and no. It depends on locality, in irrigated areas yes. You may use irrigation to other crops. In rain-fed there may be a negative competition.*						Cf: Guidance
4.1.2 Are food supplies increasing on local markets?		Moderate/Low	2	*If there is cash, there will appear more food in markets. Drought affects everything and the food supply declines. The same of floods for the irrigated areas.*						Cf: Guidance
	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
4.2 Accessibility of food										
4.2.1 Do people have more income to allocate to food?		Moderate/Low	2	*Yes, it is a cash crop.*						
4.2.2 Are (relative) consumers food prices decreasing?		Moderate/Low	2	*It depends on the amount of food supplies. The lesser the amount the higher the price. In times of crisis the food prices increase.*						Cf: Guidance

	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
4.3 Utilisation and nutritional adequacy										
4.3.1 Is the nutritional quality of available food improving?		Moderate/Low	2	*In irrigated areas yes, also due the proximity to the big markets. In rain-fed they grow climate resilient crops. Rarely the people in rural rain-fed areas have proteins. They eat goat and sheep. Pastoralist communities they tend to search for water sources. Most communities keep livestock for wealth.*						
4.3.2 Are nutritional practices being improved?		Moderate/Low	2	*Not really. In rain-fed areas nutrition keep being poor. In irrigated food availability is better, but quality keeps being poor. There is no nutritional education at the community level.* They never think that way.						Cf: Guidance
4.3.3 Is dietary diversity increased?		Moderate/Low	2	*The sesame improves the family income but this doesn't improve food availability. If the family has migrated, they might change their food habits. Even the food market is very limited in rural areas. Cultural determines food habits.*						Cf: Guidance
	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
4.4 Stability										
4.4.1 Is risk of periodic food shortage for household reduced?		Moderate/Low	2	*Sesame income reduces food shortage, yet they may contribute to increase food prices. If there is a climate disaster it will affect food availability. Combination of sesame with food crops to have food on the table and cash in the pocket.*						
4.4.2 Is excessive food price variation reduced?		Not at all	1	*With cash from sesame, you can get what you want from the market. It depends of the quantity. It is a seasonal crop so when there is more income the prices are higher. It goes twice but one is better than the other. There is instability that affects prices. There is no protection in terms of prices. Sometimes it is excessive.*						Cf: Guidance
	Average:	**Moderate**	**1,50**	**1,50**		**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***	
5. SOCIAL CAPITAL										
5.1 Strength of producer organisations										

5.1.1 Do formal and informal farmer organisations /cooperatives participate in the value chain?		Substantial	3	*Yes, there are farmers cooperatives that are active. Some are 'ghost' cooperatives. You find both in both regions. The most interesting ones are found in irrigated areas. Bay-cooperatives. They help on storage, market and consultation. All is informal. The cooperatives are registered by the MoAI.*						
5.1.2 How inclusive is group/cooperative membership?		Moderate/Low	2	*If you have access to land and to crops and something to supply (goods, income) you may be a member. Women are members. IDP people don't have access to land easily so this is a constraint to be part of the cooperative. This may be mitigated if the newcomer belongs to the same host community (lineage). It is based on community structure. Local arrangements may be made in more cosmopolitan communities. In Jowhar several different people live together (i.e., Somali Bantu refugees – IDP conflicts more in riverine areas). They don't inter-marriage. Some Somali do not accept them. Yet, when speaking about cooperatives they might be well integrated. They are good farmers.*						Cf: Guidance
5.1.3 Do groups have representative and accountable leadership?		Substantial	3	*Yes. They have representatives and the leaderships are accountable.*						
5.1.4 Are farmer groups, cooperatives and associations able to negotiate in input or output markets?		Moderate/Low	2	*In some places, if there have connections with exporters or large-scale retailers/ brokers (good supply). It depends on relations of trust that is built buy the cooperative leader or someone influential in the cooperative. For the vast majority of farmers there is very limited negotiation power even if they are organised.*						
	Average:	**Substantial**	**2,50**	**2,50**		**Final:**	**Substantial**	**2,50**	***Justification if adjustment of the score level = ...***	
5.2 Information and confidence										
5.2.1 Do farmers in the value chain have access to information on agricultural practices, agricultural policies, and market prices?		Not at all	1	*Not on policies. In what refers prices it depends on the networks that were built. Agricultural practices may come from the external demand. They may even be compelled to produce a certain crop instead of another. There are no extension services.*						
5.2.2 To what extent is the relation between value chain actors perceived as trustworthy?		Moderate/Low	2	*In some places, if there have connections with exporters or large-scale retailers/ brokers (good supply). It depends on relations of trust that is built buy the cooperative leader or someone influential in the cooperative. For the vast majority of farmers there is very limited negotiation power even if they are organised.*						Cf: Guidance
	Average:	**Moderate**	**1,50**	**1,50**		**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = ...***	
5.3 Social involvement										

5.3.1 Do communities participate in decisions that impact their livelihood?		Moderate/Low	2	*Yes, the government is not in a position to help anybody. There are community consultations, needs assessment. Mostly the government is only in a position to advocate responding to an organisation. Some communities are very strong and some are weak. It is rare to find communities well organised.*						Cf: Guidance
5.3.2 Are there actions to ensure respect of traditional knowledge and resources?		Moderate/Low	2	*These actions exist at the community level. Cultural and religious leaders make sure that traditional knowledge passes across generations.*						Cf: Guidance
5.3.3 Is there participation in voluntary communal activities for benefit of the community		Moderate/Low	2	*When there is an accident due to poor infrastructures, they join together to find a solution. Irrigation structures are repaired by the community*						
	Average:	**Moderate**	**2,00**	**2,00**		**Final:**	**Moderate/Low**	**2,00**	***Justification if adjustment of the score level = …***	
6. LIVING CONDITIONS										
6.1 Health services										
6.1.1 Do households have access to health facilities?		Not at all	1	*Very rare in sesame growing areas. The population consult traditional hillers, midwives. The population needs to travel 50 kms to reach a health centre, they use donkey charts in rainy season and if some vehicle the person in need pays for the fuel, if available. The covid: sheep meat with hot spices, people drink that boiled water. No vaccination in rural areas. Some NGOs may approach the communities. It is project based, if the project ends there is no support. Even health centres are run by NGO.*						Cf: Guidance
6.1.2 Do households have access to health services?		Not at all	1	*Very rare in sesame growing areas. The population consult traditional hillers, midwives. The population needs to travel 50 kms to reach a health centre, they use donkey charts in rainy season and if some vehicle the person in need pays for the fuel, if available. The covid: sheep meat with hot spices, people drink that boiled water. No vaccination in rural areas.*						Cf: Guidance
6.1.3 Are health services affordable for households?		Moderate/Low	2	*Very rare in sesame growing areas. The population consult traditional hillers, midwives. The population needs to travel 50 kms to reach a health centre. They use donkey charts in rainy season. If there is a vehicle available, the person in need pays for the fuel. The covid: they ate sheep meat with hot spices, people drink that boiled water. No vaccination in rural areas.*						Cf: Guidance
	Average:	**Not at all**	**1,33**	**1,33**		**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***	
6.2 Housing										

6.2.1 Do households have access to good quality accommodations?		Moderate/Low	2	*Good quality roofs and walls: structure – iron sheets roofs; walls: mud, bricks, thatch (both roof and walls). Bad quality: they cannot stand the heat and the rain (shelters). In sesame production areas the best housing you find are middle quality: mud wall with thatch roofs. IDPs live in tents (the worse).*						
6.2.2 Do households have access to good quality water and sanitation facilities?		Not at all	1	*Rain-fed populations drink from the ponds and shallow wells with no filtration. Irrigated areas they get directly from the river. Most households have to share sanitary facilities.*						
	Average:	**Moderate**	**1,50**	**1,50**	**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***		
6.3 Education and training										
6.3.1 Is primary education accessible to households?		Not at all	1	*It exists in some places mostly in irrigated areas and run by NGOs. There are villages without primary education. Koranic schools frequently replace formal education.*						
6.3.2 Are secondary and/or vocational education accessible to households?		Not at all	1	*Only if the farmer has not just income but also values education. It is very rare*						
6.3.3 Existence and quality of in-service vocational training provided by the investors in the value chain?		Moderate/Low	2	*NGOs do the training. TLM (teaching learning materials) 3000 teachers contracted through World Bank.*					Cf: Guidance	
	Average:	**Not at all**	**1,33**	**1,33**	**Final:**	**Moderate/Low**	**1,50**	***Justification if adjustment of the score level = …***		
6.4 Mobility										
6.4.1		n/a	n/a	*Please add justification.*						
6.4.2		n/a	n/a	*Please add justification.*						
6.4.3		n/a	n/a	*Please add justification.*						
	Average:	**n/a**	**n/a**	**n/a**	**Final:**	**n/a**	**n/a**	***Justification if adjustment of the score level = …***		

Annex VI – Social Profile

SOCIAL PROFILE (V.2017-0)		Value chain:	
Date last modif.:	20/01/2026	Country:	*Somalia*

Domain	Present profile		Trend
	Score level	Count	
1. WORKING CONDITIONS	Moderate/Low	1,50	↑
2. LAND & WATER RIGHTS	Moderate/Low	1,83	↑
3. GENDER EQUALITY	Moderate/Low	2,07	↑
4. FOOD AND NUTRITION SECURITY	Moderate/Low	1,88	↑
5. SOCIAL CAPITAL	Moderate/Low	2,00	↑
6. LIVING CONDITIONS	Moderate/Low	1,50	↑

Overall Recommendation by type of actor
The application of the social sustainability methodology to the sesame VC identifies working conditions and living conditions as domains of greatest concern rather than land and water rights, food and nutrition security and gender equality despite having also rather low scores. Small-scale farmers producing sesame, which account for the vast majority of VC actors, face a range of risks and vulnerabilities. They are embedded within rural socio-cultural organisation, with an important role of traditional authorities that compensates a non-existent governmental environment. Oil millers either use very low mechanisation or were able to improve their milling structures yet lacking any kind of regulation to improve oil quality. Exporters are compelled to do several post-harvest operations to comply with the external demands. They have built reliable networks with middlemen/middlewomen and brokers who buy the sesame grain from farmers at lower prices with no bargaining. They would like to benefit more from the governmental institutions although they are free to operate at their own will with high risk but no major constraints.

Major Issues – questions replied in red
The questions scored in red relate mostly with working conditions and living conditions. Due to significant challenges faced by the Federal Governments of Somalia, including insecurity, weak institutional capacity, limited rural reach, and fragmented authority, which affect its ability to deliver services and protect citizens' rights effectively, living conditions are the most problematic domain because sesame VC actors in Somalia, especially farmers, face a combination of low income, even the income generate by sesame production, marketing and employment in the sesame sector is low, inadequate basic services, poor housing and sanitation facilities, and lack of educational and training services, which together severely limit their well-being and resilience.

Risk/Cost of Non-Intervention vs. Benefits
Sesame production in Somalia faces multiple challenges. Low wages, limited capital, difficult working conditions, and climate variability make it unattractive to youth, who often migrate to urban areas. Women dominate labour but face resource, wage, and social constraints. Land and water tenure insecurity, weak governance, poor infrastructure, and limited producer influence reduce productivity and equity. Households remain vulnerable to food insecurity, conflict, and climate shocks. Isolation, inadequate services, and poverty persist, while humanitarian interventions only partially address these systemic economic, social, and environmental vulnerabilities.
Key Mitigating Measures
Key mitigating measures for improving Somalia's sesame sector include strengthening small farmers' bargaining power through cooperatives and collaborative agreements, implementing price stabilisation and minimum wages, and empowering traditional authorities. Support community-validated land tenure and flexible federal policies. Expand women's access to credit, land, training, technology, and markets, while reducing time poverty. Enhance climate-resilient practices, irrigation, storage, extension services, and market access. Strengthen social safety nets, healthcare, housing, and education via mobile clinics, community schools, and awareness campaigns. Promote inclusive governance and participatory planning to increase rural communities' influence.

Annex VII – Social profile major risks and mitigating measures per domain

SESAME		COUNTRY:	*SOMALIA*		DATE LAST MODIFICATION:	20/01/2026
Dimension	Count	Score level	**Trend**	**Major risks and possible negative consequences**	**Mitigating measures**	
1. WORKING CONDITIONS						
1.1 Respect of labour rights	2,00	Moderate/Low	↑	ILO has some intervention in Somalia but there is no law enforcement, working conditions do not respect decent labour rights conventions. The major risks are at the rural levels. The private sector dominates and labour is informal. The risk is labour exploitation affecting mostly vulnerable groups. There are no workers' organisations. Labour exploitation also exists at upper segments at the chain but it happens 'behind the curtain'. Increasing the labours wages will mean increasing the market prices. At least there should be a minimum wage implemented and monitored by government authorities.	Government empowerment. Community education and sensitisation. Empowering traditional authorities.	Collaborative agreements. Increase bargaining power of small farmers. Strong functional policies. Prices stabilisation controlled by government structures. Minimum wages should be implemented.
1.2 Child Labour	1,50	Moderate/Low	↑	Child labour is widespread and there are no cultural constraints. Children are often paid for their labour. The major risk is Child labour discouraging children's school attendance. They are applied in all task related production, although the harder tasks are done by men. Also abusing children by using them for difficult tasks, fetching water is a hard task for a child. Children from vulnerable communities are more at danger. The score *moderate/low* takes into account that despite being a serious situation, there are children in farms integrated in family labour displaying light tasks.	Community education and sensitisation. Empowering traditional authorities.	Collaborative agreements. Improve the number of schools. Parents' awareness, value attributed to education.
1.3 Job safety	1,00	Not at all	↑	There are no PPE. Accidents happen. Farmers are not aware of chemical risks.	Community education and sensitisation. Empowering, training traditional authorities.	Collaborative agreements.

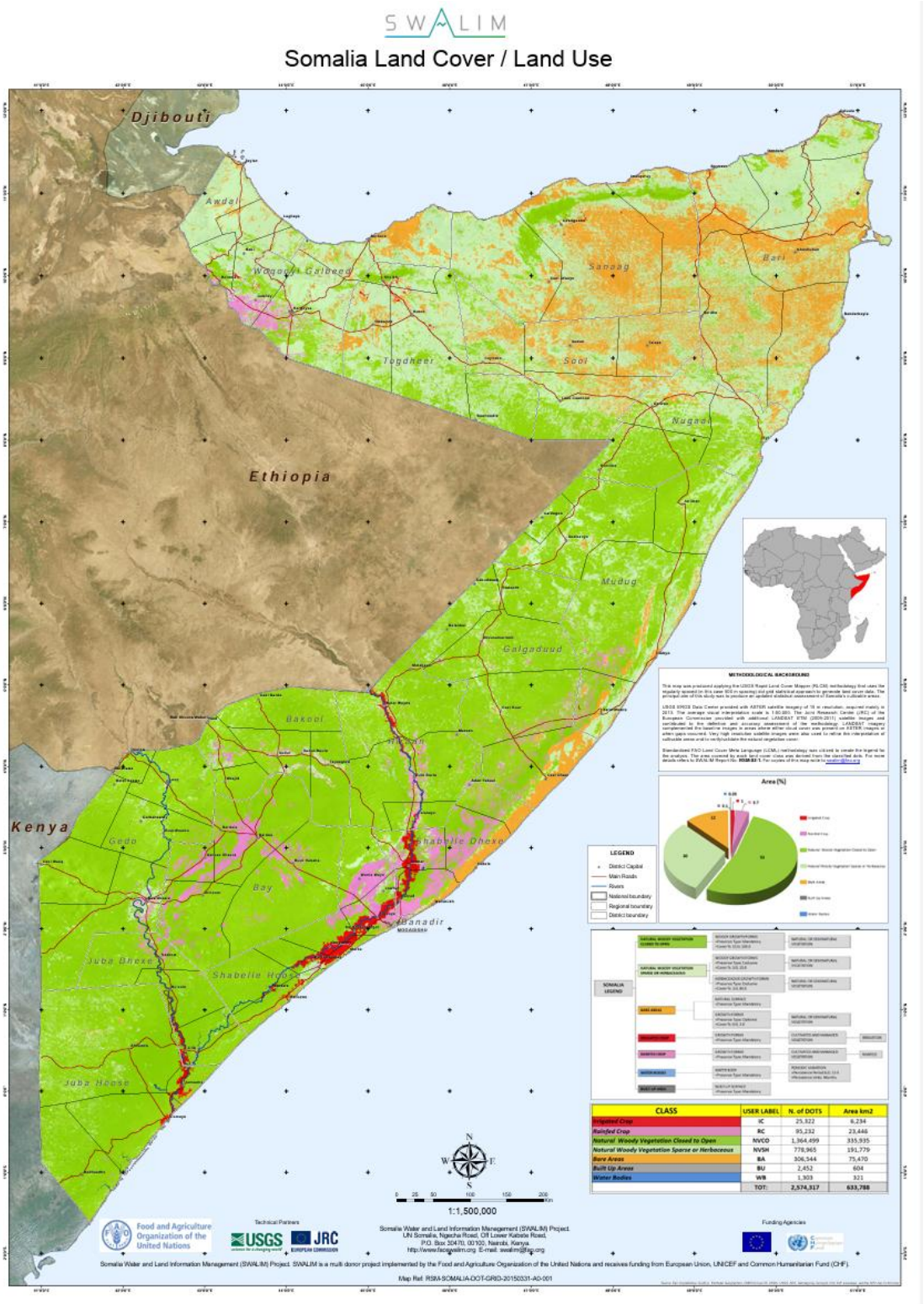
1.4 Attractiveness	1,50	Moderate/Low	↑	There is the risk that sesame will not be attractive for the next generations. Lack of capital is one of the main reasons. The wages are very low. The labour situation is unfair, the tasks related to sesame production are hard to execute. Due to climate uncertainty, the production is also uncertain. Distances are big, youngsters prefer to be close to urban centres. To become an entrepreneur in the VC itself it is also risky since the youngster need to invest capital and foresee possible benefits at short. It has a demand; the price is good. There is the risk that youngsters flee to urban areas and are caught in very difficult situations.	Government empowerment. Community education and sensitisation.	Empowering traditional authorities. Collaborative agreements. Mechanisation. Access to finances. Security and stability.
Average	1,50	Moderate/Low	↑			
2. LAND & WATER RIGHTS						
2.1 Equity and security of land and water tenure	2,00	Moderate/Low	↑	Equity and security of land and water tenure in Somalia are major development and governance challenges, and current conditions fall short of what most frameworks consider secure, equitable tenure.	Formally recognise xeer and Sharia principles in land and water governance, while setting minimum equity standards (e.g., protection for women, minorities, IDPs).	Develop federal guiding principles rather than rigid national laws, allowing Federal Member States (FMS) to adapt rules to local realities.
2.2 Respect of Water rights	2,00	Moderate/Low	↑	Access to water sources depend on customary allocations, often regulated by elders or community water committees.	Expand water committees to formally include women, minority clans, IDPs, and youth, not just elders.	Introduce rotating representation to prevent domination by a single lineage or group. Use simple bylaws that define who can participate and how decisions are made.
VGGT compliant Large-Scale Land Acquisition	1,50	Moderate/Low	↑	Farmers do not have any king of protection from land grabbing by LSLAs, yet it doesn't happen in the targeted regions.	Support community-validated documentation of who farms what land, for how long, and under which customary arrangements.	
Average	1,83	Moderate/Low	↑			
3. GENDER EQUALITY						

3.1 Economic activities	3,00	Substantial	↑	Women make up a majority of the workforce in sesame production, performing tasks like cleaning, salting, drying, oil pressing, and small-scale trading. They also dominate small-scale local processing and market activities such as sesame oil production, which can be a source of higher value income if linked to markets.	Land and property rights: Enact and enforce laws guaranteeing women equal ownership, inheritance, and control over land and property.	Financial inclusion policies: Require banks and financial institutions to offer collateral-free loans, lower interest rates, or special credit lines for women entrepreneurs.
3.2 Access to resources and services	2,00	Moderate/Low	↑	Women constitute a large share of labour in sesame production-especially in post-harvest processing and in small-scale trading and oil processing. However, their access to productive resources and services is often limited by structural barriers.	Expand women's access to credit, land rights, training, cooperatives, technology, extension services, markets, and decision-making through inclusive policies and support.	Support leadership training, reform norms, and ensure women's inclusion in farmer organisations.
3.3 Decision making	2,60	Substantial	↑	Evidence from general agriculture in Somalia shows that although women participate in multiple value-chain activities, **men are still the primary decision-makers** regarding production decisions, land use and control of revenues, with women often excluded from formal decision spheres.	Promote joint decision-making, strengthen women's land and revenue rights.	Support leadership training, reform norms, and ensure women's inclusion in farmer organisations.
3.4 Leadership and empowerment	1,75	Moderate/Low	↑	Women are central to production and increasingly gaining organisational voice, but structural and cultural barriers still limit their leadership roles and influence over higher-level value-chain decisions.	Strengthen women's leadership quotas, mentoring, and advocacy; address cultural norms	Ensure access to finance, networks, and platforms influencing value-chain governance.
3.5 Hardship and division of labour	1,00	Not at all	↑	Women experience time poverty from combining agricultural labour with household responsibilities.	Reduce women's time poverty through labour-saving technologies, and gender-responsive extension support.	Support community awareness on women's workload and division of labour at the household level. Collaborative work with village elders and religious leaders.
Average	2,07	Moderate/Low	↑			
4. FOOD AND NUTRITION SECURITY						
4.1 Availability of food	2,00	Moderate/Low	↑	While sesame zones contribute to agricultural livelihoods, food availability there remains vulnerable due to below-average staple crop production, climate risks, and broader national food insecurity pressures,	Enhance climate-resilient crops, diversify food production, improve irrigation, strengthen storage, expand extension services	Support market access, and provide early-warning systems.

4.2 Accessibility of food	2,00	Moderate/Low	↑	While sesame zones contribute to agricultural livelihoods, food availability there remains vulnerable due to below-average staple crop production, climate risks, and broader national food insecurity pressures.	Promote complementarity with other drought-tolerant crops, diversify production, improve irrigation, strengthen storage.	Provide extension services, enhance market access, and implement early-warning food security systems.
4.3 Utilisation and nutritional adequacy	2,00	Moderate/Low	↑	Even where sesame production generates income, households face challenges in food utilisation and nutrition, due to low dietary diversity, poor WASH, and limited complementary foods. Sesame contributes with energy and healthy fats but does not fully ensure nutritional adequacy.	Promote dietary diversity, improve WASH, provide nutrition education, support complementary foods, fortify staples.	Enhance food access.
4.4 Stability	1,50	Moderate/Low	↑	Food stability in Somali sesame areas is fragile, with households frequently exposed to climate shocks, market fluctuations, conflict, and seasonal income gaps. Even when sesame production is good, food security can remain unpredictable.	Implement climate-resilient farming practices, diversify income.	Strengthen local markets, provide social safety nets, improve storage, early warning systems, and conflict-sensitive interventions
Average	1,88	Moderate/Low	↑			
5. SOCIAL CAPITAL						
5.1 Strength of producer organisations	2,50	Substantial	↑	In Somalia's sesame sector, producer organisations exist. In Bay region there some active cooperatives which support farmers. INGOs programmes (e.g., USAID's GEEL) have strengthened some aspects of production through training and demonstration plots, but producer organisations themselves still lack strong governance, financial systems, and market leverage.	Strengthen cooperative governance, build financial management capacity.	Improve market access, provide training, facilitate collective bargaining, support value addition, and foster accountability systems.
5.2 Information and confidence	1,50	Moderate/Low	↑	Most sesame producers operate informally or individually, with restricted bargaining power and reliance on traders (middle-men) and brokers due to lack of collective organisation. Limited extension services: Farmers, especially women and other vulnerable groups such as IDP, have restricted access to agricultural extension, training, and modern agronomic techniques.	Promote farmer cooperatives, enhance collective bargaining.	Expand inclusive extension services, provide training, support women and IDPs, and improve access to modern agronomy.
5.3 Social involvement	2,00	Moderate/Low	↑	While sesame producers contribute labour and knowledge, their actual participation in decisions that affect production, marketing, and policy is limited, particularly for women. Strengthening producer organisations, inclusive governance, and participatory planning could enhance their influence over livelihoods.	Strengthening producer organisations, inclusive governance, and participatory planning could enhance their influence over livelihoods.	

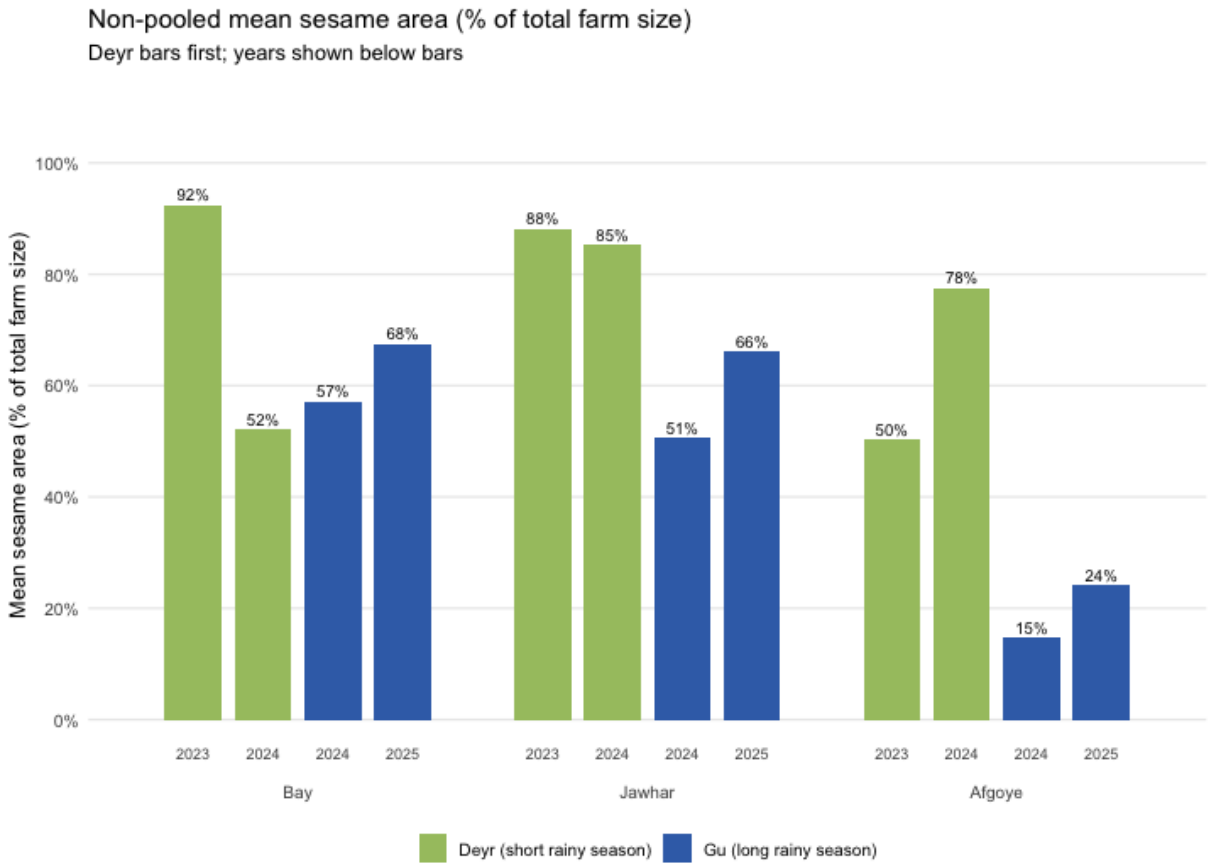
Average	2,00	Moderate/Low	↑			
6. LIVING CONDITIONS						
6.1 Health services	1,50	Moderate/Low	↑	Health services are almost inexistent in the areas where sesame is grown. Rural communities must travel long distances to reach basic health services, creating barriers for regular and emergency care. Gender inequalities are apparent with girls' attendance rates being much lower.	Create mobile clinics during planting and harvest seasons when farmers cannot travel far.	Integrate services farmers need most: basic treatment, maternal care, vaccinations, malnutrition screening.
6.2 Housing	1,50	Moderate/Low	↑	The housing structures reflect the farming populations' economic constraints, they are simple with no sanitation facilities. In the Shabelle regions the housing situation is slightly better.	Integrate housing support in Agriculture related programs.	Housing construction trainings, especially for houses suffering from flooding.
6.3 Education and training	1,50	Moderate/Low	↑	According to UNICEF, Somalia has one of the lowest rates of children attending primary schools. The primary schools are distant from the villages. There is no compulsory primary school attendance. It depends on how families value education.	Improve education access through community schools supported by local committees or NGOs.	Promote community awareness campaigns.
6.4 Mobility	n/a	n/a	↑			
Average	1,50	Moderate/Low	↑			

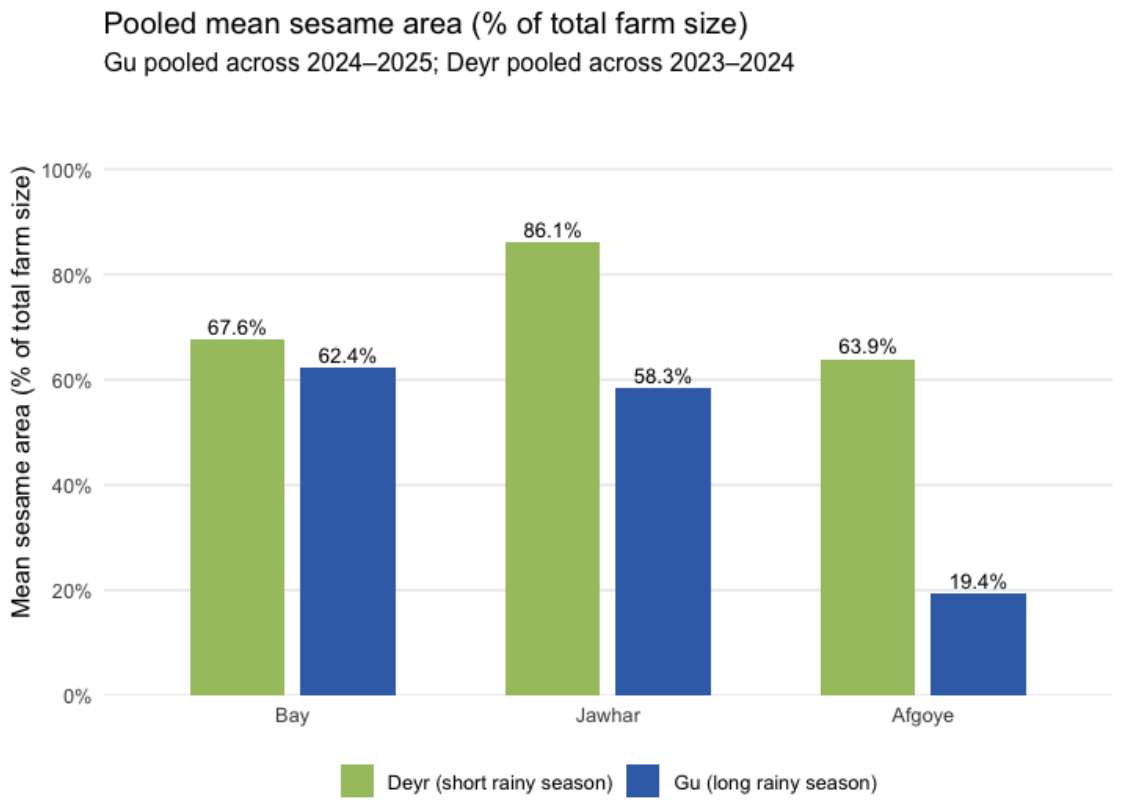
Annex VIII – Map of Somalia showing Land Cover / Land Use map

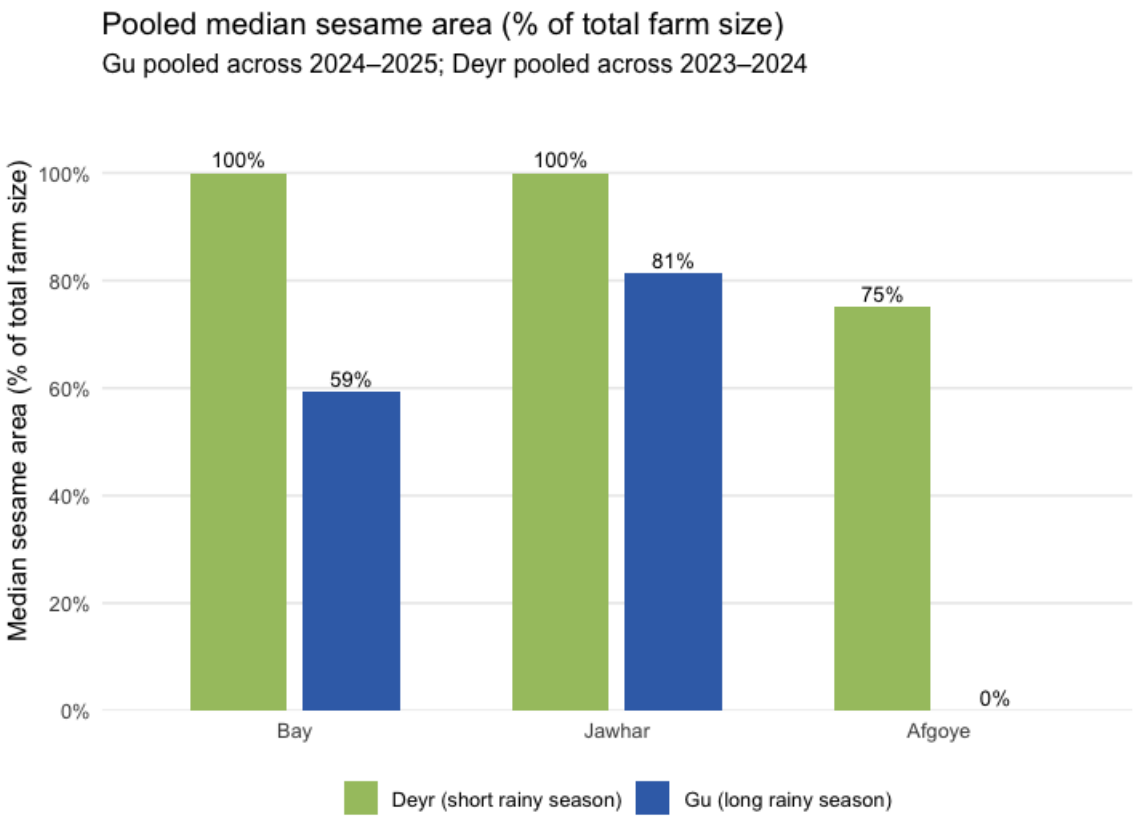


Source: FAO-SWALIM, 2007.

Annex IX – Proportion of total farm land used for sesame cultivation compared between regions (medians or means, pooled or non-pooled across years)




Pooled mean sesame area (% of total farm size)
Gu pooled across 2024–2025; Deyr pooled across 2023–2024
Mean sesame area (% of total farm size)
100%
80%
60%
40%
20%
0%
67.6%
62.4%
86.1%
58.3%
63.9%
19.4%
Bay
Jawhar
Afgoye
Deyr (short rainy season)
Gu (long rainy season)


Pooled median sesame area (% of total farm size)
Gu pooled across 2024–2025; Deyr pooled across 2023–2024
Median sesame area (% of total farm size)
100%
80%
60%
40%
20%
0%
100%
59%
100%
81%
75%
0%
Bay
Jawhar
Afgoye
Deyr (short rainy season)
Gu (long rainy season)

Annex X – Median and mean sesame yields (kg/ha) across seasons and years (2023 – 2025) per region

SEASON–YEAR	BAY			JOWHAR			AFGOYE		
	n	MEDIAN (kg/ha)	STD. DEV. (KG/HA)	n	MEDIAN (KG/HA)	STD. DEV. (KG/HA)	n	MEDIAN (KG/HA)	STD. DEV. (KG/HA)
Deyr 2023	1	0	318	4	293	128	6	350	169
Deyr 2024	5	400	60	11	291	258	10	406	76
Gu 2024	6	281	186	5	250	76	2	257	10
Gu 2025	6	350	181	9	357	237	6	439	53

SEASON–YEAR	BAY			JOWHAR			AFGOYE		
	n	MEDIAN (kg/ha)	STD. DEV. (KG/HA)	n	MEDIAN (KG/HA)	STD. DEV. (KG/HA)	n	MEDIAN (KG/HA)	STD. DEV. (KG/HA)
Deyr 2023	1	183	318	4	324	128	6	321	169
Deyr 2024	5	402	60	11	248	258	10	398	76
Gu 2024	6	278	186	5	252	76	2	257	10
Gu 2025	6	346	181	9	321	237	6	433	53