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VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

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Analysis of the sesame value chain in Somalia

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural, aquaculture and fisheries development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders, businesses, society, and environment.

The European Commission has developed a standardised methodological framework for analysis (https://capacity4dev.europa.eu/projects/value-chain-analysis-for-development-vca4d/info_en). It aims to understand to what extent the value chain allows for inclusive economic growth and whether it is both socially and environmentally sustainable.

Value chain context

The sesame value chain (VC) in Somalia is a strategic sector for food security and export revenues. It generates approximately US$ 39.7 million (€ 34.94 million) in total value added, representing 0.3% of the national GDP corresponding to 0.5% of agricultural GDP. The agricultural structure is overwhelmingly dominated by smallholder family farmers, who constitute 98.6% of the actors and typically cultivate plots of 1 to 2.5 hectares. Land ownership and access to irrigation water are primarily regulated through customary law (Xeer), which remains an important governance mechanism in the rural areas. At the same time, the limited reach and capacity of formal state institutions contribute to uncertainty around land tenure and water resources rights, particularly for women and internally displaced populations. The VC is labour-intensive and features minimal mechanisation. Key structural constraints include extreme vulnerability to climate shocks, particularly droughts and floods, severely deteriorated irrigation infrastructure, and an asymmetric market structure dominated by local intermediaries, leaving farmers with little bargaining power.

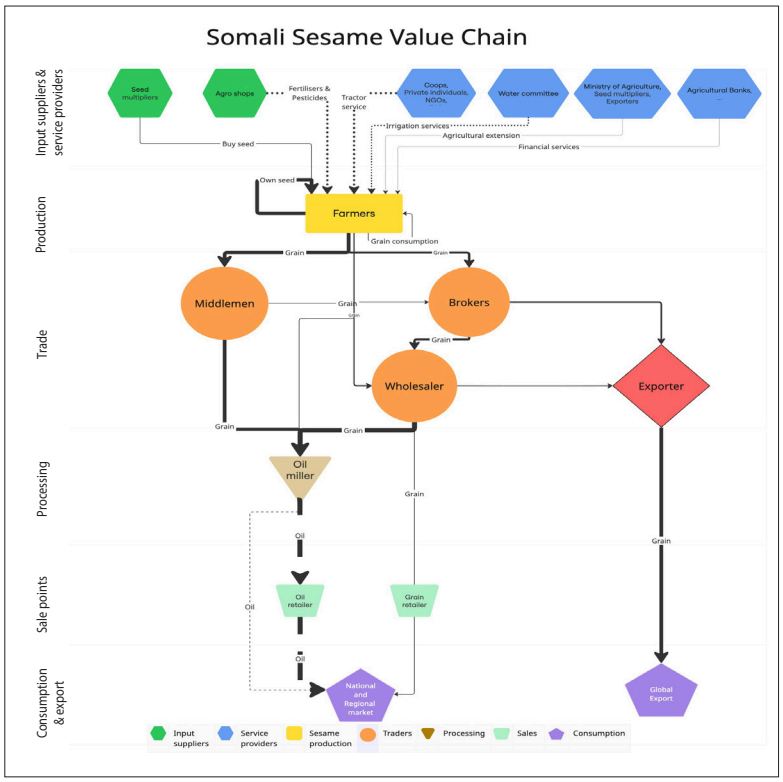

Figure 1: Flowchart of the sesame VC

Intervention de l'UE

The European Union (EU) actively supports the resilience and commercial development of the sesame VC. The EU finances institutional strengthening and technical assistance through initiatives like the OUTREACH II and PROACT programmes, which aim to boost competitiveness and foster public-private-producer partnerships. Regarding sustainability initiatives, the EU Member States are co-financing the strategic Jowhar Offstream Storage Programme (JOSP) to rehabilitate water management infrastructure and mitigate flood risks. Policy alignment is achieved through direct support to the Federal Government for managing agricultural, land, and water resources. Furthermore, trade agreements and strict EU quality standards act as catalysts for technological modernisation, incentivising exporters to transition from water-intensive wet dehulling to highly efficient dry dehulling.

Functional analysis

Production

National production is estimated at 34,000 metric tons grown on approximately 75,727 hectares for the reference year 2024. Yields are low (a median of 250 to 400 kg/ha) and exhibit massive interannual variability driven by climate shocks. The sector is operated by small family farm structures. Regional differences are distinct: the Bay region relies on highly vulnerable rain-fed agriculture, whereas Lower and Middle Shabelle regions utilise riverine irrigation systems that are highly susceptible to flooding. Climate constraints are severe, with Deyr season droughts and Gu season floods acting as primary yield limiters. Technologically, cultivation is highly monoculture relying almost entirely (>95%) on the local Dunyar variety. Mechanisation is very low, mostly limited to hired tractors for land ploughing. Fertiliser use is suboptimal and imbalanced (median 33 kg/ha of Diammonium Phosphate).

The typology of sesame producers is based on shared characteristics such as production systems (rain-fed versus irrigated), location, farm size and land ownership, labour characteristics, market orientation, processing activities, and labour use (Figure 2).

Processing and marketing

The post-harvest processing sector features traditional camel-powered mills, over 300 motorised small-to-medium oil millers, and a few high-technology industrial plants such as Som Seed Agri. Approximately 75% of production is consumed locally or regionally as grain and oil, while 25% is exported. Trade flows typically move from farmers to intermediaries and wholesalers before reaching millers or exporters. Logistics and transport are heavily constrained by deteriorated roads—such as the critical Afgoye Corridor—and security checkpoints that inflate costs. The main export markets are China, India, Turkey, the Middle East, and the EU. While Somali sesame has price competitiveness (average export price around US$ 1.75/kg (€ 1.54/kg)), a lack of standardisation, high contamination rates, and the absence of pure white seeds drastically limit its value in premium markets.

Sub-chains

Distinct sub-chains are not specified, as varieties grown across the various production systems are almost the same whilst downstream actors do not separate grains originating from rain-fed versus riverine irrigated systems. The characteristics of the three functional segments of the VC are presented below.

- Primary Production: Involves over 90,000 smallholders. This segment generates essential rural income but suffers from low productivity, climate vulnerability, and weak bargaining power.
- Trade: Comprises intermediaries (middlemen), brokers, and a concentrated group of wholesalers. Although few, these actors handle massive volumes, control market access, and dictate prices.
- Processing and Export: Includes oil millers and structured export firms. This segment drives international market integration, over 90% of the sector's temporary jobs, and captures the highest structural margins through economies of scale.

Governance of the value chain

Institutional governance is severely fragmented following the 1991 state collapse. The central government effectively ceased functioning until 2012, when the Federal Government of Somalia gained international recognition, although rebuilding state institutions has been a prolonged process. Political disputes over power-sharing, constitution and elections continue to create instability. This is aggravated by recurrent droughts, famine, population displacement, and fights over grazing/land and water. In rural areas, government institutions have minimal regulatory capacity, leaving a vacuum often filled by NGOs. Regulatory oversight and conflict resolution regarding land and water rely almost exclusively on customary law (Xeer) and Village Development Committees (VDCs). Financial governance is provided by Islamic microfinance institutions, but farmers' access is structurally blocked by a lack of formal land titles acting as collateral. Limited access to credit disproportionately affects women, youth, and other vulnerable groups, including displaced populations. Strategic reforms aim to increase production by 50% over five years, establish industrial processing, and improve export certification.

FARMERS' TYPES	System	Regions	Land size	Markets	Processing/ by products
SMALL – Family farmers	Rain-fed	Bay region, Bakool, Gedo, Hiraan Lower Shabelle and Middle Shabelle regions	1 ha -2.5 ha	Primarily domestic market / selling to middlemen/brokers immediately after harvest.	Animal feed The majority is sold (mostly to oil millers) Oil refined using old machines
COMMERCIAL SMALL/ MEDIUM/ LARGE	Irrigated	Jowhar, Middle-Shabelle region Located in riverine zones: along the Shabelle river + Canals rehabilitated and extended by FAO	Small = 1-2 ha Medium = 2-5 ha Large = 5-15ha	Some large farms have direct links to exporters	Animal feed Oil refined using improved machines
LARGE – Export oriented	Riverine irrigation	Afgoye, Lower Shabelle +Rehabilitated canals by FAO	200-600 ha of own farmlands	Some export-oriented farmers have their own farmlands while collaborating with small-scale farmers	Animal feed Oil refined using improved machines

Figure 2: Typology of sesame farmers

What is the contribution of the value chain to economic growth?

Financial viability for the actors

All actors in the sesame VC achieve positive margins, though profitability is highly skewed. Farmers achieve high net operating profit (NOP) margins per kg of sesame sold (49% in rain-fed systems, 21% in irrigated systems). Sesame farmers in the rain-fed system have also the highest values of Return on turnover (operating profit/ production) and Benefit/Cost ratio (operating profit/ total expenses) (Figure 3). However, their actual incomes are severely constrained by liquidity issues and a lack of storage, forcing them into distress sales immediately after harvest.

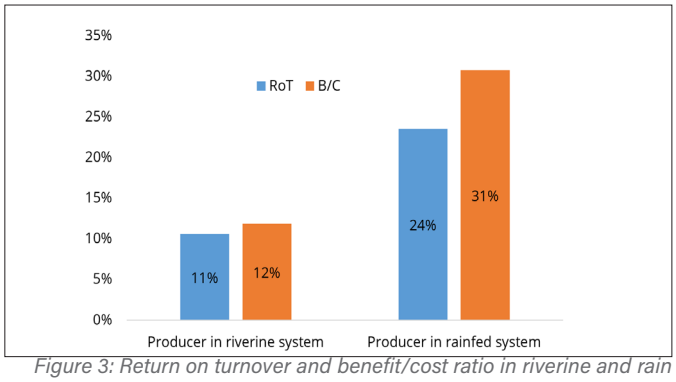

Figure 3: Return on turnover and benefit/cost ratio in riverine and rain fed systems

Traders (intermediaries and wholesalers) operate on lower unit margins (5% to 14%) but extract massive structural profits due to the large volumes they consolidate. Processors exhibit varied viability: industrial exporters and traditional camel millers enjoy robust margins (26% and 34%, respectively) due to grain supply from farmers and niche markets respectively, whereas intermediate oil millers face tight margins (9%) because raw material costs consume up to 75% of their expenses.

Landowners capture a negligible share of the value added (2%). The absence of formal credit structurally stifles the financial expansion of all actors. It is noteworthy that women are actively engaged as grain aggregators, traders, and oil millers despite having limited access to land and other productive assets, including credit and training.

Impacts on the national economy

The sesame VC generates a total value added (VA) of US 39.71 million (€ 34.94 million) which is split into direct VA (US 20.57 million (€ 18.10 million)) and indirect VA (US 19.13 million (€ 16.83 million). The direct VA is mainly composed of NOPs of the actors (88%) (Figure 4).

The contribution of the VC to national and agricultural GDP is weak (less than 1%). However, it is well integrated within the national economy since total VA represents 75% of the total production (US 52.62 million (€ 46.3 million)), meaning that the VC relies very little on imports and strongly stimulates the local economy through domestic intermediate goods and services.

The sesame VC's exports account for 0.4% of national exports, and its imports represent 0.1% of the national imports. The total wages paid within the VC represent 1.2% of the total wages paid within the economy whilst the disposable income generated from the sesame VC represent 2.6% of the Gross National Income (GNI). The contribution of the sesame VC to public finances is weak due to low taxation. Its contribution to balance of trade is positive of US$ 8.52 million (€ 7.49 million).

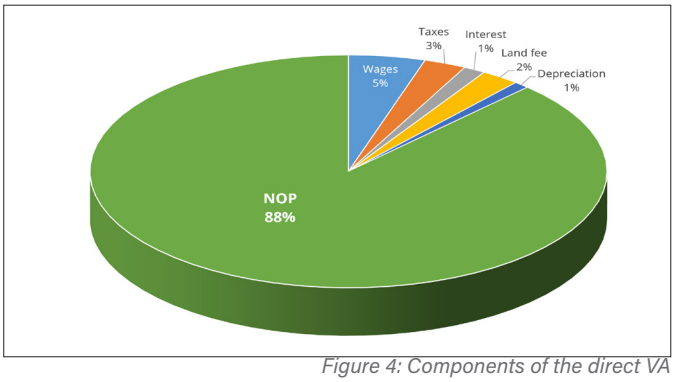

Figure 4: Components of the direct VA

Viability in the international economy

Somali sesame demonstrates a strong comparative advantage internationally, highlighted by a Domestic Resource Cost (DRC) ratio of 0.49, meaning the commodity is valued much higher globally than the cost of its domestic production factors. Export pricing is competitive, with grain sold at approximately US$ 1.75/kg (€1.54/kg). The domestic market features are characterized by macroeconomic distortions illustrated by a Nominal Protection Coefficient (NPC) of 1.24 and an Effective Protection Coefficient (EPC) of 1.37, meaning that domestic producers are protected against foreign competitors. Despite these advantages, viability is undermined by severe structural disadvantages: highly erratic production due to climate shocks, severely dilapidated transport infrastructure, and domestic conflicts. Furthermore, the lack of phytosanitary certification and the inability to supply uniform, pure white seeds prevent penetration into highly lucrative premium markets.

The value chain is consistently profitable but faces significant challenges, including high vulnerability to climate change, low levels of mechanisation, and pronounced structural inequalities. Processors and intermediaries capture the vast majority of profits due to economies of scale. Smallholder farmers suffer from tenure insecurity, lack of institutional support, and weak governance, restricting broader sector modernisation.

Is the economic growth inclusive?

Distribution of income among the actors

The direct VA breakdown demonstrates strong operational profitability, with NOP accounting for 88% of total VA (Figure 4). However, the distribution of income is highly unequal, as reflected by a Gini coefficient of 0.56. Nearly 99% of actors capture only 49% of total NOP, with farmers among the lowest-remunerated participants in the value chain. Conversely, fewer than 2% of actors receive more than 50% of total NOP.

Economic imbalances undermine inclusiveness. Relations between smallholders and exporters are economically and socially unequal, with smallholders lacking bargaining power and access to key inputs, technical knowledge, storage, finance, and irrigation. This limits value addition and resilience to price volatility. Women, youth, and displaced populations are disproportionately affected, as access to land, resources, and community integration is constrained by customary law and unequal social structures.

Job creation and employment

The sesame VC includes approximately 91,978 direct actors, predominantly self-employed smallholder farmers, and generates around 197,034 temporary jobs. Employment is highly concentrated, with over 92% of jobs created by small and medium motorised oil millers, 7% by traditional camel millers, and less than 1% by high-tech processors. Rural labour is essential for labour-intensive field activities, with women comprising up to 80% of the workforce.

Economic growth in the sesame sector is definitively not inclusive. Wealth is highly concentrated among a small number of traders and processors. Meanwhile, smallholder farmers and rural labourers bear the brunt of climate risks, suffering from structural marginalisation, poverty-level wages, and a severe lack of formal labour protections.

Is the value chain socially sustainable?

Figure 5 and the following table provide an image of the main social consequences of the VC activities in six strategic domains.

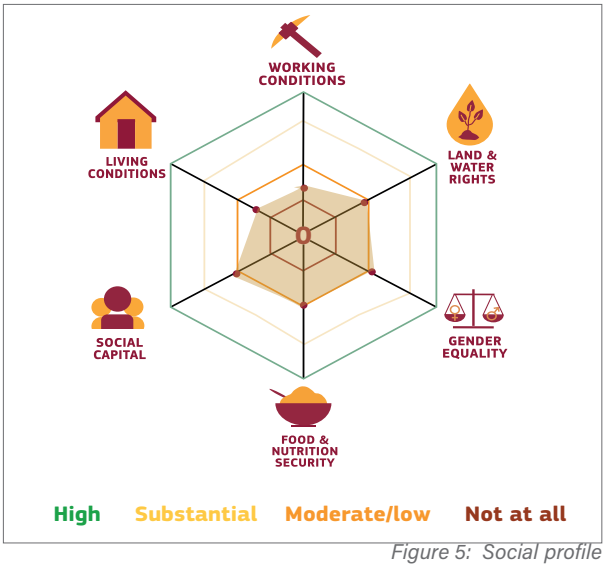

Figure 5: Social profile

The sesame value chain in Somalia has deep historical roots and remains central to rural livelihoods and local economies. However, its sustainability is increasingly constrained by climatic variability, conflict, and weak governance. As a cash crop, sesame supports household incomes and indirectly contributes to food and nutrition security. Working conditions are poor, and women and youth face persistent barriers to land access due to the dominance of customary law. Women participate in retail, small-scale trading, and some milling activities, but their engagement is constrained by economic, educational, and resource limitations. Social capital is weak, relying mainly on horizontal networks, while access to basic services remains limited and heavily dependent on international aid, particularly in areas affected by displacement.

Working conditions	▪ ILO provisions not applied in employment contracts. ▪ Agricultural work largely informal, seasonal, and precarious, with payment often daily, task-based, or in kind. ▪ High job safety risks due to machinery and unsafe pesticide handling without protective equipment. ▪ Child labour during harvest. ▪ Low attractiveness of sesame farming limiting youth interest
Land and water rights	▪ Predominantly informal access to land and water governed by customary law (Xeer), insecurity and exacerbating internal conflicts. ▪ Land grabbing, displacing vulnerable groups, deepening poverty. ▪ Frequent conflicts over degraded irrigation canals and competing pastoralist land claims. ▪ Limited land access for women and vulnerable groups.
Gender equality	▪ Women providing 80% of farm labour but own almost no land. ▪ Heavy dual workload of women and exclusion from credit, extension services, and major financial decisions. ▪ Underrepresentation of women in the VC, with participation largely confined to sesame production activities and small-scale trading in local markets, offering limited opportunities for advancement. ▪ A gradual shift of some women toward trade and oil processing activities, which are generally well accepted within their communities. ▪ Increased women's economic agency through participation in sesame VC segments beyond primary production.
Food and nutrition security	▪ Fragile food security and limited access to nutritious food despite sesame income supporting food purchases, driven by market volatility, climatic shocks, limited crop diversification, and poor infrastructure. ▪ Extremely low dietary diversity and critical malnutrition rates, exacerbated by frequent climate shocks. ▪ Disproportionate impacts of food insecurity on women and children.
Social capital	▪ Weak and fragmented collective action, relying entirely on informal clan networks. ▪ Empowerment of rural lineages in decision-making through community-based organisations. ▪ Limited bargaining power of cooperatives and heavy dependence on short-term NGO interventions. ▪ NGOs/INGOs as the closest link to policy environments.
Living conditions	▪ Poor access to health, formal education, water, and sanitation ▪ Sesame production takes place in regions inhabited by nomadic populations forced into settling (agro-pastoralist livelihoods), and displaced populations dependent on humanitarian assistance who are seeking to integrate into the rural and urban economies of these regions.

Is the value chain environmentally sustainable?

Agriculture and biodiversity

In the southern riverine zone, where most sesame is produced, agriculture occupies only 4% of the land compared to 84% natural vegetation. Overall pressure from agricultural expansion on biodiversity at the landscape scale appears limited, in line with the study sample which shows limited recent land use change among sesame farmers. Additionally, ecosystem degradation and deforestation are largely driven by charcoal production and fuelwood extraction, rather than by agriculture.

However, agricultural diversity within sesame production systems is very low as sesame is grown as a monoculture, with over 95% of farmers relying on a single local variety (Dunyar). In terms of land allocation, sesame occupies a large share of total farm area (42–100%). Farmers expressed a clear demand for increased applied research on sesame varieties.

Yield and farmer challenges

The average sesame yield is quite low and varies between 250 and 400 kg/ha/season across regions, seasons and years as climatic shocks have a large impact. Somalia ranks 21st out of 29 African countries in sesame yield, placing it in the bottom 28th percentile; 72% of African countries achieve higher average yields. 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 and region. The effect of irrigation on sesame yield could not be assessed due to confounding variables.

Resource-use efficiency

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. In this context, the EU Member States are co-financing the bilateral Jowhar Offstream Storage Programme (JOSP) which will rehabilitate water management infrastructure. JOSP is a multi-year initiative designed to strengthen water security, climate resilience, agricultural productivity, and livelihoods along the Shabelle River in Somalia.

While 60% of sesame farmers use mineral fertilizers (DAP, TSP, NPK and urea), application rates are generally low, limiting risks of pollution such as acidification or eutrophication. Organic fertilizer use ranges from 12 – 60% depending on the region. However, inadequate and imbalanced nutrient management, with limited use of lime, potassium and other nutrients, remains a concern, contributing to soil fertility decline and yield constraints.

Energy consumption is concentrated in the production phase and relies primarily on fossil fuels, mainly for N-fertilizer production, mechanised land preparation and motorised irrigation (where present). Energy use varies considerably across regions due to differences in tractor use and reliance on rainfed cultivation. The VC's contribution to climate change is relatively low (low energy consumption and land use change impact), while the impacts of climate change on agricultural production and livelihoods are severe.

Human health

90% of sesame farmers use insecticides, reflecting the high pest pressure perceived as a major challenge across the study regions, while fungicide use was not reported. The insecticides used are mostly classified as moderately hazardous, however, some highly hazardous insecticides were reported with acute toxicity risks. Unsafe handling practices remain a major concern. Farmers explicitly acknowledge gaps in their knowledge and express a clear demand for training on safe handling, storage and application practices.

Impact on biodiversity is limited, though agricultural diversity is low. Yields are low and variable mainly due to climate shocks. Water management is by far the major challenge. Soil fertility management is sub-optimal. Human health impacts from insecticides are concerning. The value chain is not very energy intensive and the contribution to climate change seems low.

Main findings and recommendations

SWOT Matrix

STRENGHTS	WEAKNESS
▪ Land availability and accessibility in production areas ▪ Water availability in riverine regions ▪ Relative drought tolerance of sesame compared to other crops in Somalia ▪ Low environmental impact of sesame production and processing ▪ Strong community support systems (cultural and religious) ▪ Educated youth engagement in the sesame VC ▪ Women's autonomy in sesame trade and processing ▪ Adoption of dry dehulling for reduced water and energy use and improved export quality ▪ No excessive pesticide residues detected in sesame exports to the EU since 2020	▪ Weak institutional capacity, including limited agricultural data, government support, and land and water governance ▪ Security-related challenges affecting safety, mobility, transport, and informal taxation ▪ Deteriorated irrigation infrastructure ▪ Low mechanisation (especially in the Bay region) and suboptimal fertiliser use ▪ Weak storage, post-harvest management and knowledge of EU quality standards ▪ Limited alignment of local varieties (e.g. Dunyar) with international market preferences ▪ Poor working conditions: occupational health risks linked to insecticide use, weak labour protections and restrictive socio-cultural norms ▪ Women's limited autonomy despite increasing participation
OPPORTUNITES	THREATS
▪ Greater mechanisation to enhance sector attractive-ness ▪ Gender-sensitive interventions for women's empower-ment, food security, and rural livelihoods ▪ Dunyar variety suitability for tahini production (sweet taste, moderate oil content, good blending properties) ▪ Strong international demand for Somali sesame (EU, Japan, Gulf countries), and export growth potential ▪ Improved storage and post-harvest management for quality compliance and export competitiveness	▪ Climate-related shocks, including droughts, floods, soil erosion, and increasing pest pressure affecting productivity ▪ Sesame sensitivity to flooding and waterlogged soils ▪ Security-related instability affecting production, trade, and mobility ▪ Dependence on international aid and uncertainty of external support ▪ Declining interest for most youth due to limited access to capital, land, and irrigation water

Recommandations

Irrigation and flood control: Extreme climate variability, particularly recurrent droughts and floods, is a major structural constraint on the sesame VC, causing low and unstable yields. Addressing these risks cannot be effectively managed at farm level alone, but require coordinated, landscape-scale investments in water infrastructure and management and flood-control systems, including canals, gates, and drainage networks, particularly along the Shabelle and Juba rivers. Programmes such as the JOSP illustrate the systemic interventions needed to improve water availability and stabilise production.

Sustainable intensification: Productivity can be improved through greater access to mechanisation, better soil management, and safer pest management practices, while reducing environmental and health risks. These interventions should be designed to be gender- and youth-sensitive.

Quality and export standards: Storage infrastructure, post-harvest management, and quality control systems should be strengthened to reduce losses and meet international standards, particularly for EU markets. Capacity building for traders and exporters on quality requirements, pesticide residues, and traceability would further enhance the competitiveness of Somali sesame in high-value markets.

Value Chain Analysis for Development (VCA4D) is a tool funded by the European Commission / INTPA and is implemented in partnership with Agrinatura. Agrinatura (http://agrinatura-eu.eu) is the European Alliance of Universities and Research Centers 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://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-

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