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**Agricultural Consultative Forum**



# **Report on the Oil Seeds Value Chain and Climate Impact Study**

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## Table of Contents

<b>Acronyms</b> .....	iii
<b>List of Figures</b> .....	v
<b>List of Tables</b> .....	v
<b>Executive Summary</b> .....	vi
<b>1. Introduction</b> .....	1
1.1. Background .....	1
1.2. Study Objectives .....	2
<b>2. Study Approach and Methodology</b> .....	3
<b>3. Key Findings</b> .....	4
3.1. Input Supply and Access .....	4
3.1.1. Input supply chains for oilseed crop production .....	4
3.1.2. Input supply for processing of oilseed crops .....	7
3.2. Production Trends.....	9
3.2.1. Changes to area under oil crops in relation to annual production: 2008 - 2019.....	10
3.2.2. Participation of farmers in oil crop production .....	11
3.3. Aggregation and Processing.....	14
3.3.1. Aggregation .....	14
3.3.2. Processing .....	15
3.4. Marketing and Trading.....	16
3.4.1. Domestic Market and Trading .....	16
3.4.1.1. Local Transaction Types and major Local Markets .....	16
3.4.1.2. Reasons for not meeting local market demand.....	17
3.4.2. Foreign Trading .....	18
3.4.3. Export market opportunities and constraints.....	25
3.4.3.1. Opportunities.....	25
3.4.3.2. Constraints .....	25
3.4.4. Formal and Informal Trade Dynamics.....	25
3.5. Consumption and Utilization .....	26
3.5.1. Consumption and Industrial Utilization .....	26
3.5.2. Nutrition.....	27
3.5.3. Livelihoods .....	27

3.5.4.	Opportunities .....	27
3.6.	Service Value Chain Functions .....	27
3.6.1.	Trade Policy Regulations and Legal Framework to support the value chain .....	27
3.6.2.	Logistics and Trade/Transport Costs.....	29
3.6.3.	Access to Finance for producers and other value chain players.....	30
3.7.	Value Chain Mapping .....	31
3.8.	Impact of Climate Change on the functioning of the value chain .....	36
<b>4.</b>	<b>Conclusion and Recommendations</b> .....	<b>38</b>
4.1.	Recommendations .....	39
<b>References</b>	.....	<b>46</b>
<b>Annexes</b>	.....	<b>46</b>

## Acronyms

7NDP	Seventh National Development Plan
ACF	Agricultural Consultative Forum
AFRICAP	Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy
CAADP	Comprehensive Africa Agriculture Development Programme
CAZ	Cotton Association of Zambia
CBZ	Cotton Board of Zambia
CDT	Cotton Development Trust
CEDORA	Crushers and Edible Oil Refiners Association
CFS	Crop Forecasting Survey
CIF	Cost Insurance and Freight
COMACO	Community Markets for Conservation
COMESA	Common Market for Eastern and Southern Africa
CSA	Climate-Smart Agriculture
DRC	Democratic Republic of Congo
FISP	Farmer Input Support Programme
FOB	Free on Board
FRA	Food Reserve Agency
GDP	Gross Domestic Product
IDC	Industrial Development Corporation
MAL	Ministry of Agriculture and Livestock
MCTI	Ministry of Commerce Trade and Industry
MoA	Ministry of Agriculture
NAIP	National Agriculture Investment Plan
NDCs	Nationally Determined Commitments
NGOs	Non-Governmental Organizations
PQPS	Plant Quarantine and Phytosanitary Services
SADC	Southern African Development Community

SCCI	Seed Control and Certification Institute
SMEs	Small and Medium Entrepreneurs
SNAP	Second National Agricultural Policy
VAT	Value Added Tax
ZABS	Zambia Bureau of Standards
ZamStats	Zambia Statistics Agency
ZARI	Zambia Agriculture Research Institute
ZCGA	Zambia Cotton ginners Association
ZCSA	Zambia Compulsory Standards Agency
ZDA	Zambia Development Agency
ZNFU	Zambia National Farmers Union
ZRA	Zambia Revenue Authority

## List of Figures

<b>Figure 1: Annual Production of four Oil Crops commonly grown in Zambia from 2008 to 2019 (in Metric Tonnes)</b> .....	10
<b>Figure 2: Annual production of oil crops, in Metric Tonnes (MT), and area planted in hectares (Ha) from 2008-2019</b> .....	12
<b>Figure 3: Annual Oil Crops' Production by Small and Medium-scale Farmers (SMF) and Large-scale Farmers (LF) from 2008-2019 (in MT)</b> .....	14
<b>Figure 4: Domestic Market-share of various oil crop products</b> .....	17
<b>Figure 5: Value of Imported Oil Crop Products in 2020 (Jan-Nov)</b> .....	18
<b>Figure 6: Proportion of Imported Oilseed Products by value, in 2020</b> .....	20
<b>Figure 7: 2020 Total Import Value of Oil Crop Products by Country</b> .....	21
<b>Figure 8: Value of Exported Oilseed Crop Products in 2020 (Jan-Nov)</b> .....	23
<b>Figure 9: 2020 Total Export Value of Oilseed Crop Products by Country</b> .....	24
<b>Figure 10: Cotton value chain Map</b> .....	32
<b>Figure 11: Groundnut value chain Map</b> .....	33
<b>Figure 12: Soybean value chain Map</b> .....	35
<b>Figure.13: Sunflower value chain Map</b> .....	36
<b>Figure 14: Oil crop yields in relation to amount of rainfall received from 2008 to 2018, in Zambia</b> .....	37

## List of Tables

<b>Table 1: Sources of inputs for Farmers, Traders, Aggregators and Processors for each Oil Crop</b> .....	5
<b>Table 2: Oil Crop Varieties officially released from 2010 to 2020 by SCCI</b> .....	6
<b>Table 3: 2020 Zambia's Imports and Exports of Oilseed Products by Quantity</b> .....	19
<b>Table 4: Cost Insurance &amp; Freight (CIF) Value ('000) of major imported oil crop commodities in four top countries in 2020</b> .....	22
<b>Table 5: Major Oilseed Commodities exported in the Top five Export Countries in 2020, by Value ('000)</b> .....	24

## Executive Summary

### INTRODUCTION

Zambia is currently experiencing rising demand for edible oils. The local edible oils supply is not meeting the demand and thus the shortfall in supply is apparently being met through imports. The rise in imports is undermining prospects for growth of the domestic oilseed industry, which has experienced substantial investments in the processing capacity. Several stakeholders in the Zambian oilseed subsector are therefore facing a number of challenges, which have been presented to the Ministry of Agriculture (MoA); seeking for the MoA's intervention in resolving them. The concerns involving edible oils were primarily raised by members of the Crushers and Edible Oil Refiners Association (CEDORA) and the Zambia National Farmers Union (ZNFU).

The notable challenges raised were:

- (i) *Toll-Processing*: This is a case in which traders who have no processing equipment apply to import crude edible oil to be processed on their behalf by other industry players who have processing facilities;
- (ii) *Importation of bulk refined edible oils by some processors but disguised as crude oil*; and
- (iii) *Increase in local prices and price fluctuations of edible oils*.

In addressing challenges in the various agricultural subsectors or industries, the MoA has adopted an industrial consensus approach. Through this approach, stakeholders are encouraged to meet and discuss the contentious issues in an effort to reach consensus and officially communicate the industrial resolution to the MoA.

At around the time the challenges within the oilseed industry were presented to the MoA, the Agricultural Consultative Forum (ACF) also submitted a proposal to develop a Soybean Strategy. The ACF's proposal aimed at contributing to the Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) Project's objectives, i.e. to facilitate the development of sustainable, productive and climate-smart agricultural systems to meet food security and economic development needs. The proposal was also in line with and supporting the implementation of Zambia's key national development policies and programmes; including the on-going review of the National Agriculture Investment Plan (NAIP). The development of a Soybean Strategy is looking at the climate resilience, food and nutrition security implications of soybeans, and the different supply chains that soybean feeds into; as well as the crop's potential to contribute to the Country's agricultural diversification agenda. The development of the Soybean Strategy is also in line with the Government's plan of developing commodity-based action plans or strategies.

In following the industrial consensus approach to resolve the challenges presented by the oilseed stakeholders, and simultaneously, embracing the soybean strategy development proposal, the MoA decided to undertake an oilseed industrial study, involving a broader stakeholder coverage, besides CEDORA and ZNFU members. The MoA appointed ACF, being neutral player in the oilseed subsector, to lead the study. The study was to cover not only soybeans but to also include other major oil crops (sunflower, cotton, groundnuts and palm oil) in Zambia: taking a value chain approach, including the impact of climate change on the oil crops. This study was also expected to generate data and information, relevant to the development of Zambia's second NAIP, and to the Biennial Review Reports (BRR) under the African Union's Malabo Declaration commitments.

The overall objective of this study was to understand the operations and functioning of the oilseed industry and identify policy levers to help enhance the value chains' contribution to the national agricultural diversification agenda, for a sustainable and climate-resilient agriculture sector.

## **APPROACH AND METHODOLOGY**

The study involved literature review and field work for collection of both, qualitative and quantitative data. Literature review involved collection of secondary data from various existing literature, such as, other study reports, institutional reports, policy documents, etc. related to the study. Field work involved collection of primary data from eight (8) selected districts in four (4) provinces, namely: Chipata, Lundazi and Petauke (Eastern Province); Kapiri Mposhi and Mkushi (Central Province); Luanshya and Mpongwe (Copperbelt Province); and Lusaka and periphery areas (Lusaka Province). The selection of the districts and provinces for primary data collection was basically based on the prominence of production, processing and marketing activities and potential of the five (5) target oil crops.

Primary data was collected through key informant interviews, using specific data collection tools (Interview Guides) for each respondent in all the value chain categories. Respondents were purposely identified and selected to cover all the value chain categories, where available, in the selected districts. However, small-scale farmers were sampled as per specific guidelines which were formulated. The study targeted collecting available field data for the past 10 years (2010-2019).

## **FINDINGS**

### **1. Input Supply and Access**

Most small-scale farmers procure agricultural inputs from the MoA's under the Farmer Input Support Programme (FISP). The variety of crop seeds distributed under FISP are assisting farmers in diversifying their crop production.

#### *2.1. Input supply chains for oilseed crop production*

Cotton: Seeds and other inputs are mainly supplied through out-grower schemes facilitated by cotton ginners and edible oil crushers. A few farmers who are not part of the out-growers scheme, use recycled seed. There are two commonly accessed varieties namely Chureza and Mahyco. Most farmers prefer Mahyco.

Groundnuts: Most small-scale farmers use recycled groundnut seed. On the other hand, few farmers who plant certified seed access it through FISP. The most commonly accessed and preferred groundnut varieties are MGV4, MGV5, Chalimbana, and Makulu Red. However, thirteen (13) varieties have been released, from 2010 to 2020, according to the Zambia Agriculture Research Institute (ZARI) researchers and the Seed Control and Certification Institute's (SCCI) seed records. Most farmers do not use other inputs (e.g. fertilizers, herbicides etc.) in groundnut production.

Soybeans: Most small-scale farmers use recycled seed (over 80%) in combination with certified seed. Large-scale farmers, on other hand, use 50% of recycled seed and 50% of certified seed. Large-scale farmers recycle the seed for two to three seasons. The most commonly accessed varieties are Dina, Spike, Lukanga, Kafue, and Mwenezi: with Dina, Kafue and Spike being most preferred varieties. This is notwithstanding the fact that 13 varieties have been released by SCCI in the last ten years. Besides seeds, farmers also use other inputs such as herbicides, pesticides, inoculant, plant boosters and basal fertilizer. However, the use of other inputs is more prevalent among large-scale farmers.



Sunflower: Certified seed is rare on the market and therefore most small-scale farmers use recycled seed. Nevertheless, even when certified seed is available, farmers prefer to use recycled seed as sunflower is considered as a “by-the-way” crop. Few farmers access and use certified seeds from FISP and out-grower schemes. The most common and preferred seed variety is Milika, due to its high oil content. Because sunflower is mostly grown in rotation or intercropped with other ‘main’ crops (e.g. maize, groundnuts and soybeans), farmers do not use other inputs, such as fertilizer, in sunflower.

### *1.2. Input supply for processing of oilseed crops*

Cotton seed: Most cotton ginning companies interviewed source cotton seed through contract or out-grower schemes. The ginning companies provide inputs and extension support to the farmers, which costs are recovered at the end of the season from sales. Although farmers’ selling prices are agreed with the ginners at the commencement of the growing season, the final price paid to the farmers is determined by the selling price on the international market. This arrangement gives unfair advantage to the companies over the farmers.

Groundnuts: The majority of processors buy groundnut grain directly from small-scale farmers (at farm-gate). Traders also buy, aggregate and supply groundnuts in bulk to processors.

Palm oil: Crude palm oil is mainly imported from Asian countries. However, the newly established Zambian Government company, Zampalm Limited, also produces crude oil for the local edible oil processing market.

Soybeans: Small-scale farmers and traders supply most of the soybean grain for processing of edible oils, including other human foods and livestock feed. Commercial farmers through contract farming as well as small-scale farmers under out-grower schemes also supply soybeans to a few processors. Nevertheless, soybean crude oil is also imported to supplement the local supply of raw materials for refined edible oil processing.

Sunflower: All sunflower processed into edible oil and cake is sourced from small-scale farmers. However, the supply is inadequate; consequently, most processors operate below their installed capacity.

Challenges: Farmers and processors face several challenges in the acquisition of inputs/raw materials for oil crop production and processing, respectively. The notable challenges for farmers include, high cost of certified seed and agro-chemicals. The major challenge for processors is the inadequate supply of seed/grain by farmers, required to operate at the full installed processing capacity: resulting in failure to meet the local market demand, particularly for edible oils.

### *1.3. Contract Farming and Out-grower Scheme Arrangements for Processing Input-supply*

Some processors engage large-scale farmers and small-scale farmers through contract farming and out-grower scheme arrangements, respectively, to supply grains/seeds for processing of edible oils and other oilseed food products. Out-grower scheme arrangements are most commonly implemented with cotton small-scale growers, among the five oilseed crops. The contract farming and out-grower scheme agreements between partners, are normally formalized in writing.

In most cases, out-grower scheme providers offer some assistance and/or incentives to small-scale farmers, such as seeds, agro-chemicals and extension services. Most out-grower scheme providers recover the agricultural inputs or the cost of inputs provided to the small-scale farmers, at the time

of buying the grain/seed. Input-support recovery mechanisms and amounts/quantities vary, depending on the out-grower scheme provider and/or provisions contained in the written agreement. Some few out-grower scheme providers, on the other hand, do not effect input recoveries on small-scale farmers.

The buying price for the supplied grain/seed is generally not indicated in the written and signed out-grower scheme agreements with small-scale farmers. The key reasons cited, by most processors interviewed, for not stating the buying price in the written agreements were: (i) the agreements are made before the commencement of the marketing season, at which time the market conditions that will prevail during the marketing season are not known, and (ii) the price may vary depending on the market forces, especially for cotton, whose price is determined by international markets. In contrast, the contract farming agreements involving large-scale farmers, to supply grain/seed, usually state the buying price in writing.

Out-grower scheme providers also encounter some challenges in the implementation of out-grower schemes. The notable cited challenges were: (i) non-compliance of small-scale farmers to some contractual obligations, and (ii) low crop yields and quality, leading to insufficient seed/grain for processing. Notwithstanding these challenges, all the interviewed out-grower scheme providers, indicated willingness to continue with out-grower scheme arrangements.

## **2. Production Trends**

The oil crop production sector in Zambia has continued to undergo changes. In general, the oil crops' production has progressively increased, over the last decade (2008 to 2019). Soybean has recorded the largest rapid increase in production, of about 500%. Groundnut production increased by approximately 130% while Sunflower production has also been increasing. However, Cotton seed has gradually been decreasing over the period, despite a sharp increase recorded in 2012. Nevertheless, there have been notable seasonal fluctuations in annual production figures of all the four crops, especially in cotton seed and groundnuts. The fluctuations have largely been attributed to volatile market prices. Oil crops' production now seems to be shifting to soybeans, away from dominance of groundnuts and cotton seed: soybeans is attracting better prices and ready market. Sunflower, on the other hand, remains unexploited despite its production potential as an oil crop and higher oil-content. Projections show that these trends are likely to continue even into the next decades.

### ***2.1. Participation of farmers in oil crop production***

Among the three categories of farmers in Zambia, small-scale farmers have historically dominated the production of cotton, sunflower and groundnuts; except soybeans.

Cotton seed: Approximately, 300,000 small-scale farmers are involved in cotton production, accounting for nearly all the cotton seed produced in Zambia. However, this number has gradually reduced over time. Small-scale cotton production has predominantly been through out-grower schemes, generally facilitated by multi-national ginning companies. Parrogate, Louis Dreyfus Company (LDC) and Alliance Gineries are the three major players involved in cotton, controlling 85% of Zambia's cotton production.

Groundnuts: Small-scale farmers account for slightly more than 95% of the groundnuts produced in Zambia, which are mainly grown in Eastern, Muchinga and Northern Provinces.

Sunflower: Most of the sunflower produced by small-scale farmers is grown in Eastern, Central and Southern Provinces. Large-scale (commercial) farmers have also negligibly been contributing to the total national sunflower production.

Soybeans: Unlike cotton, sunflower and groundnuts, large-scale farmers have dominated the production of soybeans. Large-scale farmers produce more than 60% of the Country's total soybeans production. However, small-scale farmers' contributions to soybeans production have also been increasing, over time. For example, from 2015, annual production by small-scale farmers increased from under 50,000 MT to a historical high of 150,000 MT in 2017, before it slightly dropped to around 125,000 MT in 2018. Nevertheless, this contribution could still not surpass the contribution from large-scale farmers, who are even fewer in number compared to small-scale farmers. This is largely because soybean yields by large-scale farmers are higher than those of small-scale farmers.

### **3. Aggregation and Processing**

#### **3.1. Aggregation**

Almost all of the aggregators interviewed were involved in soybean grain aggregation. Most soybean aggregators also aggregated groundnuts; with very few dealing in sunflower and cotton seed. All the interviewed aggregators sourced their commodities predominantly from small-scale farmers.

The aggregators interviewed had varying storage capacities, with the highest reporting 300,000 MT. Most aggregators, on average, only manage to bulk less than 50% of their storage capacity with oil crops (soybeans, groundnuts, and sunflower), while the rest is stored with maize. Among the three oil crops, soybeans take up the largest proportion of the storage space. The failure to store up to the full capacity, by most aggregators, was attributed to: (i) inadequate supply of the commodities by farmers, (ii) insufficient capital and cash-flow challenges, (iii) low capacity to mobilize the commodities from all farmers, and (iv) simultaneously selling of the commodities while aggregating.

Most aggregators sell their grains locally, mainly to the current three (3) major off-takers and oilseed crushers, namely, Global Industries Limited, Mt. Meru Millers Zambia Ltd and Parrogate. A few aggregators also export to Zimbabwe, Mozambique, Malawi, Tanzania, and South Africa.

#### **3.2. Processing**

Types of processed products and methods of oil extraction: The most common locally processed product from oil seeds is refined edible oils, followed by crude oil. Some crude oils are also imported and ultimately refined into cooking oil, locally. Other processed products include: semi-refined oils, cake, livestock feed, soybean meal, full-fat soya, and peanut butter. A few processors also produce snacks, chunks, beverages, and high-protein supplements from soybeans.

The most common method of oil extraction used by edible oil processors is mechanical pressing. Some few edible oil processors use solvent extraction.

Processing capacity: Zambia's current total crushing capacity of oilseeds is estimated to be 800,000 MT per year; but is aimed at increasing to one million metric tons per year. Global Industries Limited (with the largest crushing capacity), Mt. Meru Millers Zambia Ltd and Parrogate, being the three major processors, account for the largest proportion of the current total crushing capacity. The number of small and medium-scale processors is also growing.

The findings of this study are that the Country has adequate (or more than adequate) installed capacity for processing oil crops into edible oils and other food products to meet the national demand. However, nearly all processors interviewed are currently not operating at full installed capacity, mainly due to inadequate supply of raw materials by farmers. Other reasons cited for not operating at full capacity are illegal imports of refined oils on the local market, inadequate financial capacity and limited local demand for other processed products, such as cake, livestock feed and full-fat soya.

#### **4. Marketing and Trading**

##### ***4.1. Domestic Market and Trading***

Local markets are the major markets where most oil crops and oilseed processed products are traded. However, some traders sell at both local and foreign markets: even then, local trading still accounts for a larger proportion of the traded commodities. The local market arrangements for harvested grains/seeds, include farm-gate sales, open (public) markets and at bulking centers within districts and major towns. Processed products, e.g., refined edible oils, peanut butter, soya chunks, soybean meal and cake, cotton cake, and sunflower cake, etc. are sold at different market segments, such as open markets, chain stores, wholesalers, retailers, aggregators, middlemen/traders, distributors, NGOs, processors and local livestock farmers, etc. Transactions in domestic markets are predominantly on cash basis. In general, however, the specific payment method depends on the buyer and/or seller.

Reasons for not meeting local market demand: The study found that most processors are unable to meet the local demand for edible oils and other products. The key challenges identified for failing to meet the market demand were:

- a) Inadequate supply of raw materials by farmers;
- b) Capacity to utilize other processed by-products, such as cake, is low. Thus, the processor drastically reduces the quantity of soybean crushed into edible oils to avoid flooding the market with the by-product, which would reduce the price;
- c) Some processors have inadequate or lack finances to buy sufficient quantities of raw materials to meet their installed processing capacity; and
- d) Unstable electricity power supply affects processing.

##### ***4.2. Foreign Trading***

Imports: Several respondents reported that the local oil crops production is not enough to meet the country's edible oil consumption. The shortfall in the local supply of raw materials for processing is, therefore, met through importation of crude soybean oil and crude palm oil; including refined oils, to a lesser extent. For example, Zambia spent K643 million (US\$35.44 million) and K639 million (US\$35.39 million) on crude soybean oil and crude palm oil imports in 2020, respectively.

In 2020, the Zambia Statistical Agency (ZamStats) data show that South Africa was the major import source for most oilseed products, followed by Malaysia, Argentina and Mauritius. Crude soybean oil, crude palm oil and palm olein were the three (3) major imported products from these countries. However, most respondents interviewed pointed out that these three products were actually imported from Argentina, Mauritius and Malaysia and not from South Africa. South Africa was just used as the country.

Effect of imported edible oils, oil-crop seeds and other oilseed food products on the domestic market for edible oils: Several respondents noted that imports have both a positive and negative effect on the local oilseed market. The positive effects include:

- ✓ helping to meet local demand; and
- ✓ Cheaper imported products help to stabilize prices and thus, make edible oils more affordable for consumers as a result of competition.

On the other hand, the respondents mentioned the following negative effects, among others:

- Imported branded products are preferred by consumers, thus reducing the demand for locally processed products; locally processed products are perceived to be of low quality.
- Cheaper imported products pose unfair competition to locally processed oilseed products. High cost of local production disadvantages Zambian oilseed processing industries.

Exports: In 2020, soybean cake (worth about K560 million) was the major oilseed export commodity followed by soybean flour and meal, and cotton seed. The responses from key informant interviews conducted confirm that this has been the trend even in other years. South Africa, Botswana, Namibia and Zimbabwe are the main export destinations.

Export market opportunities and constraints: A number of opportunities and constraints for export markets were identified. The key ones were:

#### Opportunities

- i). There is readily available regional and global market for oil crops and processed products: with good prices, especially that Zambia produces non-genetically modified seeds.
- ii). Zambia has favourable weather conditions, enough arable land and a good number of farmers for the production of oil crops.
- iii). The country has adequate installed processing capacity for oil crops into edible oils and other products, with potential to export surplus production to outside markets.
- iv). Export markets provide an opportunity to earn foreign currency.
- v). Export markets provide an alternative market, in case of local market failure.

#### Constraints

- i). Oil crop productivity and production, particularly among small-scale farmers, is low, due to various challenges.
- ii). Some processed products do not meet international standards for export.
- iii). The centralized issuance of export permits creates bureaucracy.
- iv). Zambian products on export markets tend to be uncompetitive, due to various factors, e.g. high production, processing and transportation costs.
- v). Different rules and documentation processes across countries make it difficult to access export markets.
- vi). There are language barriers at some border markets, such as Kasumbalesa in the DRC, which middlemen use to exploit local suppliers.

#### 4.3. Formal and Informal Trade Dynamics

There are reported cases of illegal trading across borders, facilitating entry of smuggled cooking oil and other oilseed products into the Country. For example refined cooking oil is smuggled into the Country by disguising and declaring it as crude oil, because crude oil attracts less import levies/taxes.

Most respondents attributed the prevalence of the illegal import and export trading to various factors, such as: attractive prices offered by foreign buyers and sellers; corruption in the issuance of import

and export permits; bureaucracy involved in the process of obtaining export permits (enables some traders to altogether shun the process, and resort to trade informally/illegally). Illegal trading between or among Zambia's neighbouring countries is exacerbated by the porosity of borders with these countries.

## **5. Consumption and Utilization**

The study found that the current national edible oils consumption is about 10,000 to 12,000 MT per month. However, only 40% to 50% of this demand is met from local processing, because of inadequate quantities and quality of local raw materials supplied. The Country crushes 3,500 MT/month of grain/seed and imports about 10, 000 MT/month crude palm and soybean oil, in order to meet the national consumption demand.

The current national demand for soybean meal/cake is said to be 100,000 MT/Year. This demand is not enough to take up all the soybean meal that is produced or can potentially be produced, if processing is at full capacity. It is estimated that 75% to 80% of the total quantity of soybean crushed ends up as cake/meal, which is supplied locally, with the surplus exported to other countries: 15% to 20% of the crushed soybeans is what ends up as edible oil.

Nutrition and Livelihoods: Most of the respondents interviewed reported that the consumption of various processed oilseed products has had a positive impact on their nutritional requirements, e.g. children's nutrition has improved. However, most small-scale farmers interviewed have a challenge of not having their own processing equipment for oil crops; and thus, depend on local processors to process their crops. Similarly, the majority of respondents interviewed reported improved livelihoods, through increased incomes generated from selling the grown and processed oil crops.

## **6. Service Value Chain Functions**

### 6.1. Trade Policy Regulations and Legal Framework to support the value chain

The respondents were engaged to ascertain their knowledge about the existing policies, procedural regulations, mechanisms and legal provisions for engaging in foreign trade involving oilseed crops and associated processed products. Most interviewed respondents were quite knowledgeable about the existing Zambian import regulations, mechanisms and systems; and that, imported commodities are not only certified to meet Zambia's standards and specifications (regulations) but also the rules of origin for the Southern African Development Community (SADC) and Common Market for Eastern and Southern Africa (COMESA).

The respondents also identified the institutions responsible for the certification and regulation of imported oil seeds and processed products. These are the MoA (*Department of Agribusiness and Marketing, ZARI's Plant Quarantine and Phytosanitary Services, and SCCI*), Ministry of Commerce Trade and Industry (*Zambia Compulsory Standards Agency [ZCSA], and Zambia Bureau of Standards [ZABS]*), and Zambia Revenue Authority (ZRA). However, most respondents were not aware that ZCSA, is now the institution responsible for administering, maintaining and ensuring compliance with compulsory standards; and not ZABS, after the repealing of CAP 416 Act of 1994.

### 6.2. Logistics and Trade/Transport Costs

This study found that logistical and transport costs are a challenge for most small and medium-scale farmers, and aggregators. These impact on their capacity to commercialize, expand and enhance performance of the oilseed subsector. Some of the cited transport and logistical challenges are: poor state of most feeder roads, some main roads and bridges; Council levies; lack of proper storage

facilities within the locality of small-scale farmers and small aggregators; selling through middlemen; poor market linkages and information; low prices offered to small-scale farmers for oil crops; and inadequate extension services provided on oil crops.

### *6.3. Access to Finance for producers and other value chain players*

Most respondents interviewed, particularly Small and Medium Entrepreneurs (SMEs), and small and medium-scale farmers, cited inadequate finances as limiting production, including achieving optimum operational and output levels.

However, majority of the respondents interviewed, revealed that the financial challenges they were experiencing were not linked to lack of or inadequate liquidity in the financial markets; or their inability to mobilize enough finances, but due to the unfavourable terms and conditions for borrowing imposed by formal financial institutions, e.g., high interest rates. Thus, respondents proposed some measures for increasing access to finances, such as reducing the interest rates and provision of agricultural loans in kind.

The Zambian financial providers (commercial banks and other financial institutions) are also facing a number of challenges. The banking sector's major concern is the high levels of non-performing agricultural loans; especially for loans and/or overdrafts granted to small-scale and emergent farmers.

On the other hand, financial institutions also appear to have their own institutional limitations. Most of the Country's commercial banks and other financial institutions do not seem to have a good understanding of the small-scale agricultural sector, especially the risks involved. Additionally, they do not have adequate and appropriate infrastructure and human resource skills required for marketing and monitoring financial services to the small- and medium-scale farmer category.

## **7. Impact of Climate Change on the functioning of the value chain**

Like many other countries, globally, Zambia's agricultural sector has also been experiencing adverse climate variability. The projected climate change impacts range from rises in temperature, floods, and droughts to occurrences of other weather-associated adverse events.

By looking at the effects of climate change on the productivity and production of oil crops in Zambia, this Study shows that indeed climate change has adversely affected the oilseed subsector. The major effect has been reduced yields due to shifts in precipitation and proliferation of pests and diseases. Among the four oil crops (soybeans, cotton, groundnuts and sunflower), groundnuts showed more resilience to climate change while soybean was the least resilient.

For further insight on the impact of climate change on the four oil crops, an analysis of the yields of the crops in relation to rainfall, over a ten-year period (2008 to 2018) was undertaken. The results of this quantitative analysis show that the variations in the amount of rainfall received in each growing season seems to have had little or no effect on the yields of cotton and groundnuts: a general indication that groundnuts and cotton have some appreciable tolerance to drought, as compared to the other two crops. Higher amounts of rainfall tend to reduce the yields of soybean. For sunflower, the results do not show a clear effect of variations of rainfall on the yield. This analysis also affirms that, among the four oil crops, groundnuts have the highest resilience to climate change effects, and rainfall in particular, while soybean is the least resilient.

## **CONCLUSION AND RECOMMENDATIONS**

The oilseed subsector has been growing, especially with the good and available market for oil crops and associated processed products, both within and outside the Country. Therefore, the subsector has potential for attainment of full commercialization in Zambia, and increased contribution to the Country's socio-economic growth and development, including environmental sustainability.

The current installed processing capacity of edible oils and other processed oil crop products in the Country, is enough to meet the local demand for these products and even produce surplus which can be exported. Zambia has been importing a lot of crude soybeans oil and crude palm oil to supplement the low supply of raw materials for refined edible oil production; in order to meet the local demand for edible oils. However, the local commercial production and processing of palm oil has begun in recent years, with the opening of a government-owned company, namely Zampalm Limited.

Among the four (4) main locally grown oil crops in Zambia (i.e. soybeans, sunflower, groundnuts and cotton), soybeans appears to be the most attractive and showing increasing growth and potential. Although sunflower has the highest oil-content among the four crops, not so many farmers are growing the crop. There appears to be no reliable local market for groundnuts, but with ready and promising market outside the Country, especially in DRC. With the collapse of most local cotton processing factories, after the Country's privatization programme, the cotton value chain has seen a decline in performance.

The Zambian oilseed subsector has a good number of players processing edible oils and other products like cake and livestock feed. However, there are few local processors producing other food products for enhanced human nutrition, such as soybean chunks and high-protein supplements.

Although soybeans is gaining much prominence in production it is the least resilient to climate change effects, with groundnuts being the most resilient, among the four studied oil crops.

The major challenge currently inhibiting the attainment of increased or full commercialization of the sub-sector, among the cited challenges, is the low productivity and production of the oil crops.

### **Recommendations**

In order to address and/or minimize the several identified bottlenecks in the oilseed sub-sector the following broader categories of recommendations are proposed:

- i). Increase the productivity and production of the oil crops;
- ii). MoA, as well as the private sector, should enhance extension service-delivery, including Capacity-building for oil crops, especially to small-scale farmers; but also to some willing large-scale farmers;
- iii). The Government should strengthen foreign trade controls, in order to seal loopholes for illegal imports and exports of oilseed products; and allow markets to operate freely;
- iv). The government (through FRA and FISP) and the trustworthy private buyers should broaden the local market services and support for oilseed crops and processed products. Similar policy and technical support accorded to the maize sub-sector should also be offered to the oilseed sub-sector;
- v). The government (through institutions, such as ZRA and Ministry of Finance), and the private sector (through Zambia Association of Manufacturers), should encourage, support and facilitate establishment of more local oilseed processing/crushing industries (particularly SMEs): especially in major oil crop growing districts;



- vi). The Government, through the Ministry of Finance and Bank of Zambia (BOZ), should come up with deliberate and appropriate policies and regulations to ease financial accessibility and offer affordable finances to boost the growth and development of the agricultural sector;
- vii). All agricultural stakeholders should intensify Climate-Smart Agriculture (CSA) practices in order to mitigate the current and future climate change effects;
- viii). The Ministry of Finance, through ZRA, should provide tax incentives for the oilseed subsector and ensure compliance to tax regulations by the industry players, e.g. by reducing Value-Added Tax (VAT) on edible oils; and
- ix). Government should provide a consistent agricultural policy environment, especially on market and trade policies. This will enable effective and efficient business planning and encourage participation of more value-chain players in the oilseed subsector.

# 1. Introduction

## 1.1. Background

The seventh National Development Plan (7NDP) has identified a number of national priorities. The key focus areas of the 7NDP include: industrialization, poverty reduction, development of the agricultural sector through crop diversification and value addition.

Zambia is currently experiencing rising demand for edible oils. However, the major part of the demand is apparently being met through imports, mainly of palm oil, rather than through domestic production. This rise in imports is undermining prospects for growth of the domestic industry, which has experienced substantial investments in processing capacity, as well as oilseed production. Several stakeholders from the oilseed subsector and/or industry in Zambia have, therefore, presented a number of challenges and submissions to the Ministry of Agriculture (MoA), with a request for the MoA to intervene in resolving the challenges. The concerns within the oilseed subsector, involving edible oils (crude, semi-refined and refined), were raised primarily by members of two industry stakeholders, namely the Crushers and Edible Oil Refiners Association (CEDORA) and the Zambia National Farmers Union (ZNFU). The notable challenges raised were:

(i) *Toll-Processing*: This is a case in which traders who have no processing equipment apply to import crude edible oil to be processed on their behalf by other industry players who have processing facilities;

(ii) *Importation of Refined Edible Oil by Processors*: This is a case where some processors import bulk refined edible oil but disguised as crude oil; and

(iii) *Increase in local Prices and Price fluctuations of edible oils*: An observation where there is a general increase in local prices and price fluctuations of edible oils, despite there being undisrupted importations of considerably cheaper crude oil. This development has resulted in a general reduction in local production of oilseed crops (e.g. soya beans) by smallholder farmers who are the major bulk producers.

The Ministry of Agriculture has taken cognizant of the fact that various (subsector) industries in the agricultural sector, have a lot of value chain players whose interests in most cases are divergent. Therefore, the Ministry has adopted an industrial consensus approach in addressing challenges in each industry. This is done by encouraging stakeholders to meet and discuss the contentious issues in an effort to reach consensus and officially communicate the industrial position or resolution to the Ministry.

At around the time the oilseed stakeholders presented submissions to the MoA on the challenges within the oilseed industry, the Agricultural Consultative Forum (ACF) also submitted a Concept Note proposal to develop a Soybean Strategy. The proposal aimed at contributing to the Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) Project's objectives of facilitating the development of sustainable, productive and climate-smart agricultural systems to meet food security and economic development needs. The proposal was also in line with and supporting the implementation of Zambia's key current national policies and programmes, namely, the Vision 2030, Seventh National Development Plan (7NDP), Second National Agricultural Policy (SNAP), National Food and Nutrition Strategic Plan (2017-2021), and

the on-going review of the National Agriculture Investment Plan (NAIP). The development of a Soybean Strategy is looking at the climate resilience, food and nutrition security implications of soybeans, and the different supply chains that soy bean feeds into; as well as the crop's potential to contribute to the Country's agricultural diversification agenda. Further, the development of the Soybean Strategy is also in line with the Government's plan of developing commodity-based action plans or strategies: such as the already existing Second National Rice Development Strategy and Cassava Development Strategy.

In trying to resolve the above presented challenges within the oilseed subsector and in pursuing the same spirit of industrial consensus; and at the same time, embracing the proposal for the development of a soybean<sup>1</sup> strategy, the MoA decided to have a detailed understanding of the operations and functioning of the oilseed sector. The MoA, therefore, appointed the ACF to spearhead the undertaking of an independent oilseed industrial study, involving a broader stakeholder coverage, besides the members of CEDORA and ZNFU. The study was to cover major oil crops in Zambia that include soybeans, sunflower, cotton, groundnuts and palm oil; and tackling various factors, i.e. national requirements, production, installed processing capacity, consumption, imports and other market dynamics, including climate impact on the oilseed crops.

In selecting ACF to lead the oilseed study, the MoA noted that ACF is a neutral player in the oilseed subsector, and also considered the fact that ACF had been in the forefront of facilitating the formulation of both, the Rice and Cassava Development Strategies. Additionally, ACF has previous experience in facilitating the review of various agricultural policies and programmes.

The Study is to be followed by a stakeholder consultation and validation process, to discuss and harmonize all issues currently affecting the industry. This study is also expected to form the basis for developing action plans for the commodities under review, as well as other key national, regional and international strategic development programmes and commitments, e.g., the Comprehensive Africa Agriculture Development Programme's (CAADP), second NAIP, the African Union's Malabo Declaration commitments, the Nationally Determined Commitments (NDCs), etc. through the generation of relevant data as input into these programmes.

## 1.2. Study Objectives

The overall objective of this study was, therefore, to understand the operations and functioning of the oilseed industry and identify policy levers to help enhance the value chains' contribution to the national agricultural diversification agenda, which is private-sector driven, for a sustainable and climate-resilient agriculture sector; which assures national and household food and nutrition security. The study is to provide evidence on the important parameters of the oilseed sector, such as, national requirements, national production, installed capacity, consumption, imports and other market dynamics; including the impact of climate change on the oilseed sector in Zambia.

The specific objectives were:

- i) To identify and evaluate the challenges and opportunities, including other major issues, in the Zambian oilseed value chains and recommend ways of addressing the challenges while taking advantage of existing opportunities.

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<sup>1</sup> Realizing that soybean is also an oil crop

- ii) To arrive at an oilseed industrial consensus position on the Country's production, supply and processing capacity, including national requirements for soybeans, groundnuts, sunflower and cotton (edible oil crops).
- iii) To inform government and stakeholders on appropriate policy actions that will bring about desirable and sustainable outcomes in the oilseeds sector.
- iv) To explore the potential of soybean in contributing to climate-resilience and human and livestock nutrition; in leading to the development of a national soybean development strategy.
- v) To assess the climate sensitivities and overall risks of key target crops (soybeans, sunflower, cotton, groundnuts, and palm oil) and their value chains.

## 2. Study Approach and Methodology

Qualitative and quantitative data was collected using both, literature/desk review and field data collection. Literature review involved collection of secondary data from various existing literature, such as, other study reports, institutional reports, policy documents and strategies, etc. related to the study. Field data collection involved collection of primary data by undertaking trips to selected provinces and districts within the Country.

The selection of the provinces and districts to be visited by the Study Team<sup>2</sup> for primary data collection (including some literature collection) was largely based on the prominence of production, processing and marketing activities and potential of the five (5) target commodities, i.e., soybeans, sunflower, cotton, groundnuts, and palm oil. Also taken into account in the selection of the provinces and districts to visit were the available financial resources and time for undertaking the study. Based on the above criteria, eight (8) districts were selected in four (4) provinces, i.e., Chipata, Lundazi and Petauke (Eastern Province); Kapiri Mposhi and Mkushi (Central Province); Luanshya and Mpongwe (Copperbelt Province); and Lusaka and periphery areas (Lusaka Province). Additionally, some data were collected from Nakonde District (Muchinga Province), so as to capture some direct oilseed activities at one border point. When collecting field data from outside Lusaka Province, the Study Team split into two groups, each comprising three members, i.e., one group covered Central and Copperbelt Provinces, while the other collected from Eastern Province. On the other hand, field data from Lusaka and periphery areas, was collected by three groups, each comprising two members of the Study Team.

In all the selected districts, key informant respondents were purposely identified and selected to cover, where available, all the value chain categories<sup>3</sup> of the targeted commodities. Small-scale farmers were, however, sampled as per designed guidelines: see the Annex for specific guidelines. The selected Government institutions were identified for collection of secondary data, normally collected or compiled by these institutions as per their mandate. Specific Interview Guides (data collection tools) were administered for each respondent in all the value chain categories. See Annex for each Interview Guide. Additional respondents, other than those identified before going into the field, were identified and interviewed while in the field (snowball approach). Besides the administration of the interview guides, observations by the study team members were also made

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<sup>2</sup> The Study Team, led by the ACF, comprised seven (7) members: from the ACF (2), MoA (1), Zambia Statistical Agency (ZSA)-1, Indaba Agricultural Policy Research Institute (IAPRI)-1, Ministry of Commerce, Trade and Industry (MCTI)-1, and a Consultant (AFRICAP-sponsored student at the University of Leeds). However, the plan was to have 8 members, including one officer from the Zambia Revenue Authority (ZRA), who unfortunately could not take part.

<sup>3</sup> These included Farmers (small-scale & large-scale), Input suppliers, Researchers, Aggregators, Processors, Marketers, Government & quasi-government officials, and Government institutions.

around the respondents' business premises to collect additional data. The study targeted collecting available field data for the past 10 years (2010-2019).

### Limitations of the Study

A number of targeted respondents, particularly in Lusaka, could not be interviewed as they were not willing to participate in the study. Thus, fewer respondents than planned, were covered in some respondent categories, such as the "Marketers" category. Also, other collaborating partners could not respond positively in providing their expected input, e.g. data and supporting staff. This particularly negatively affected the collection of quantitative data, for the intended ten (10) year period (2010-2019). The COVID-19 restrictions also adversely effected the successful and timely execution and completion of the study, particularly with regard to situations that required physical interactions.

## 3. Key Findings

### 3.1. Input Supply and Access

Most of the small-scale farmers interviewed receive or procure agricultural inputs from the Government, under the MoA's Farmer Input Support Programme (FISP). These farmers indicated that the variety of crop seeds distributed under FISP were helping in diversifying their crop production: more so for those farmers who receive inputs through the electronic voucher (E-Voucher) system.

#### 3.1.1. Input supply chains for oilseed crop production

**Cotton seed:** Seed, fertilizer, herbicides and pesticides for cotton are mostly accessed through out-grower schemes facilitated by cotton ginners e.g., GRAFAX, Alliance Ginneries and Louis Dreyfus Company (LDC) and edible oil crushers (e.g. Mt Meru and Parrogate). A few farmers, especially those not part of the out-growers scheme, recycle seed because they do not have a seed source. There are two commonly accessed varieties namely Chureza and Mahyco. However, farmers mostly prefer to directly purchase Mahyco because it yields better than Chureza, which is sourced mainly from the out-grower scheme.

**Groundnuts:** Findings from farmer interviews indicate that most small-scale farmers use recycled groundnut seed in combination with certified seed. Majority of the farmers confirmed planting recycled seed although the few who planted certified seed had access to it through FISP. The most commonly accessed groundnut varieties are MG4, MG5, Chalimbana, and Makulu Red. These varieties also seem to be the most preferred by farmers because they have better knowledge about them. There are, however, several other varieties that have been released by Zambia Agriculture Research Institute (ZARI) in the last 10 years. According to researchers from ZARI and the Seed Control and Certification Institute's (SCCI seed records, thirteen (13) varieties have been released, from 2010 to 2020 (See Table 2 for details). Among the farmers who confirmed receiving seed distributed under FISP indicated that this Programme was helping to diversify their crop production.

The use of chemicals is not common in groundnuts; only a few farmers indicated using herbicides, pest and disease control chemicals. There is little to no fertilizer use in groundnut production.

**Soybeans:** Most smallholder farmers use recycled seed in combination with certified seed. Recycled seed accounts for over 80 per cent of the seed grown. By contrast, large-scale farmers, combine recycled and certified seed to about 50 per cent. Large-scale farmers use the recycled seed for two to three seasons before it is replenished with certified seed. The farmers believe that the seed maintains vigor for 2 to 3 seasons. There are about five most commonly accessed varieties namely Dina, Spike, Lukanga, Kafue, and Mwenezi: this is compared to thirteen (13) varieties that have been released by SCCI in the last ten years (Table 2 shows the details). Dina, Kafue, and Spike are the three most preferred varieties by both small-scale and large-scale farmers. Farmers also use other inputs such as herbicides, pesticides, inoculant, plant boosters and basal fertilizer (i.e., Compound D). The use of other inputs is rare among small-scale farmers compared to large-scale farmers: for example, most small-scale farmers reported not to apply fertilizer to soybeans. It is, however, worth noting that use of plant boosters, inoculant, and herbicides has been increasing over time among small-scale farmers. This is somewhat driven by improved access to information on good management practices, and access to these inputs through FISP and agro-dealers.

**Sunflower:** Most smallholder farmers interviewed use recycled seed as the certified seed is not available on the market and even where it is available, farmers prefer recycled seed as sunflower is taken as a “by-the-way” crop. Farmers do not use other inputs, such as fertilizer, in sunflower because the crop is grown in rotation or as an intercrop with main crops such as maize, groundnuts and soybeans. A few farmers are accessing seed from FISP and processors who provide certified seed through out-grower schemes. The most common seed variety is Milika, which according to farmers and processors is preferred because of its high oil content.

Table 1 below, provides the details of input delivery systems for farmers, traders, aggregators and processors.

**Table 1: Sources of inputs for Farmers, Traders, Aggregators and Processors for each Oil Crop**

Category	Oilcrop	Input type (s)	Major supply sources
Farmers	Cotton	Seed, fertiliser, pesticides	Outgrower scheme/contract farming
	Groundnuts	Seed	Recycled seed/own & FISP*
	Soybean	Seed, fertiliser, inoculant, plant boosters	Recycled seed & FISP, agro-dealers
	Sunflower	Seed	Recycled seed/own & FISP
Traders/middlemen	Soybean	Grain	Small-scale farmers
Aggregators	Cotton	Seed	Small-scale farmers (contract farming/outgrower schemes)
	Soybean	Grain	Small-scale farmers & traders
Small-scale processors**	Sunflower	Seed	Small-scale farmers
Mediumscale processors***	Soybean	Grain	Small-scale farmers & traders
		Cake	Largescale edible oil processors
		Meal	Largescale edible oil processors
Largescale Processors****	Groundnuts	Grain	Small-scale farmers & traders
		Crude oil	Imports
	Soybean	Meal	Largescale edible oil processors
		Cake	Largescale edible oil processors
Seed		Small-scale farmers	
Crude oil		Ginneries	
Cotton	Cake	Ginneries	
	Crude oil	Imports	
Palm oil	Crude oil	Imports	

\*Government funded farmer input support programme

\*\*Local edible oil expellers with annual processing capacity of less than 1000Mt/year

\*\*\* Edible oil processors using mechanical extraction and processing oilcrops into other products (i.e., feed and food) with capacity less than 50,000Mt/year

\*\*\*\* Edible oil processors using solvent extraction and processing oilcrops into other products (i.e., feed and food) with capacity more than 50,000Mt/year

Source: Author’s compilation from interview data

**Table 2: Oil Crop Varieties officially released from 2010 to 2020 by SCCI**

S/N	Crop	Variety	Year of Release	Title Holder/Agent
1	Soybean (Glycine max)	PAN 1867	2010	Pannar Seeds (Z) Ltd
2		SC Sepa	2012	SeedCo International (Z) Ltd
3		SC Squire	2012	SeedCo International (Z) Ltd
4		SC Sovereign	2012	SeedCo International (Z) Ltd
5		NSO-15	2014	Africa Fertilizer (Z) Ltd
6		NSC-21	2014	Africa Fertilizer (Z) Ltd
7		Kafue	2015	Zambia Agriculture Research Institute (ZARI)
8		Mwembeshi	2015	Zambia Agriculture Research Institute (ZARI)
9		Lundi	2017	Klein Karoo Seed Marketing Zimbabwe (Pty) Ltd
10		Mwenezi	2017	Klein Karoo Seed Marketing Zimbabwe (Pty) Ltd
11		SC Sentinel	2017	SeedCo International (Z) Ltd
12		Topaz	2020	Klein Karoo Seed Marketing Zimbabwe (Pty) Ltd
13		Amber	2020	Klein Karoo Seed Marketing Zimbabwe (Pty) Ltd
1	Groundnut (Arachis hypogea)	ZamG 14	2014	Zambia Seed Company Ltd
2		CG 243	2015	New Rotations Farming
3		MGV 6	2015	Zambia Agriculture Research Institute (ZARI)
4		MGV 7	2015	Zambia Agriculture Research Institute (ZARI)
5		Wazitatu	2015	Zambia Agriculture Research Institute (ZARI)
6		Wamusanga	2015	Zambia Agriculture Research Institute (ZARI)
7		Lupande	2015	Zambia Agriculture Research Institute (ZARI)
8		Shinje	2015	Klein Karoo Seeds
9		MGV 8	2018	Zambia Agriculture Research Institute (ZARI)
10		Ngezi	2019	Klein Karoo Seeds
11		ACI Zambezi 19	2019	Canon Garth (UK) Ltd
12		MGV 9	2019	Zambia Agriculture Research Institute (ZARI)
13		ACI 0009	2020	Canon Garth (UK) Ltd
1	Sunflower (Helianthus annuus)	PAN 7351	2010	Pannar Seeds (Z) Ltd
2		PAC 36SF	2012	Advanta
3		Hysun 33	2015	Advanta
1	Cotton (Gossypium hirsutum)	CDT V	2010	Cotton Development Trust (CDT)
2		Albar Plus QM 303	2014	Quton Seed Company
3		Mahyco C 567*	2015	Maharashtra Hybrid Seed Company Ltd (Mahyco)
4		Mahyco C 569*	2015	Maharashtra Hybrid Seed Company Ltd (Mahyco)
5		Mahyco C 570*	2015	Maharashtra Hybrid Seed Company Ltd (Mahyco)
6		Mahyco C 571*	2015	Maharashtra Hybrid Seed Company Ltd (Mahyco)
7		Mahyco C 577*	2017	Maharashtra Hybrid Seed Company Ltd (Mahyco)
8		Mahyco C 608*	2017	Maharashtra Hybrid Seed Company Ltd (Mahyco)
9		Albar Plus QM 301	2020	Quton Seed Company
	* Cotton hybrid variety			

Source: Seed Control and Certification Institute (SCCI)

### 3.1.2. Input supply for processing of oilseed crops

**Cotton seed:** The majority of processors i.e., cotton ginning companies interviewed indicated sourcing cotton seed through contract or out-grower schemes. The ginning companies provide inputs and extension support to the farmers, which is recovered from sales at the end of the season. Pre-planting prices are agreed with farmers at the beginning of the growing season, although prices for cotton on the international market determine the final buying prices at harvest. While this seems effective to ensure constant supply of raw materials for the ginners, it gives unfair advantage to the companies over the farmers. The ginneries supply crude oil to mostly large-scale processors although companies such as Parrogate have their own processing facility. The cake is sold to livestock feed processors.

**Groundnuts:** The majority of processors access groundnut grain from direct farm-gate purchases from small-scale farmers. A few processors such as Community Markets for Conservation (COMACO) have out-grower schemes. Traders are another important source of raw materials for processors. The traders go early into the farms at the start of the harvest to buy, aggregate and supply groundnuts in bulk to processors.

**Palm oil:** Most of the processors import crude palm oil from countries in Asia. However, ZAMPALM Limited<sup>4</sup> with over 3,000 Ha of palm plantations, produces about 160 tonnes of crude oil for the local edible oil processing market.

**Soybeans:** Small-scale farmers and traders supply most of the soybean grain to edible oil, other human food, and livestock feed processors. There are a few processors that deal directly with commercial farmers by contract farming and individual small-scale farmers using out-grower schemes to ensure there is adequate supply of raw materials. Some edible oil processors interviewed also indicated relying on soybean crude oil imports due to limited supply of grain on the local market, especially off-season.

**Sunflower:** All the sunflower processed into edible oil and cake is sourced from small-scale farmers. However, supply is low and most processors indicated operating below their installed capacity. For example, Kapiri Oil Processors Association, Mulawe Agro-Processors & General Dealers Ltd, Wonder Feeds, and all medium-scale oil processors, operate at 20-30% of their installed capacity due to lack of sunflower seed. A similar challenge was highlighted even among the small-scale oil processors.

### **Challenges**

#### Farmers

The farmers outline several challenges that affect their access to inputs (mostly seed) for use in production of oil crops. The major challenges include, high cost of certified seed, very few agro-dealers stocking improved seeds, especially for groundnuts, unavailability of preferred seed, poor quality of seed supplied especially groundnuts under FISP, and not enough seed quantities. According to the farmers, this failure to access quality seed has greatly impacted on the productivity of most oil crops, notably groundnuts.

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<sup>4</sup> A company owned by the Government of Zambia through the Industrial Development Corporation (IDC)



### Processors

The following major challenges linked to acquisition of inputs/raw materials for production were highlighted by processors:

- i. Poor yields and production among small-scale farmers, which make them fail to meet the expected required supply for processing at full installed capacity.
- ii. The quality of the crop is poor because the farmers recycle seed and do not follow proper agricultural practices for growing the crops. Hence the crops harvested are of low quality with low oil content.
- iii. Poor loan recoveries for those involved in out-grower schemes/contract farming due to:
  - a. Low compliance levels as many farmers divert the chemicals to other crops, which negatively affects yield, especially in cotton;
  - b. Low yields due to climate change effects; and
  - c. Side-selling of the crop (which is counted as losses).
- iv. Farmers are in remote areas so there is a challenge in transportation. Thus, aggregation of the crop is costly because processors have been following farmers who are in isolated and remote places.

### **Contract Farming and Out-grower Scheme Arrangements for Processing Input-supply**

Some Processors engage farmers through contract (mainly with large-scale farmers) and out-grower scheme (mainly with small-scale farmers) arrangements, to supply them with raw materials (grains/seeds) for processing of edible oils and other oilseed food products. Out-grower scheme arrangements are most commonly implemented with cotton small-scale growers among the five oilseed crops (i.e., Soybeans, Cotton, Sunflower, Oil palm and Groundnuts). Although, there are efforts to establish similar arrangements for oil palm under ZamPalm. These contract farming and out-grower scheme agreements/obligations are normally formalized through a written contract between each partner (i.e., farmer and processor<sup>5</sup>). The contract is signed every season just before planting.

Under out-grower scheme arrangements, in most cases, out-grower scheme providers offer some assistance to small-scale farmers. Most of the out-grower scheme providers interviewed during this study stated that they provide inputs (e.g., seed, fertilizer, and pesticides) and extension services, i.e., technical support in agronomic practices, demonstrations and training. In addition to the above support, other out-grower scheme providers stated that they offer other incentives, such as paying a 10% commission to Lead Farmers<sup>6</sup>; and giving cash or crushing three (3) bags for free, for farmers who supply or sell more than the contracted quantities.

Most out-grower scheme providers, particularly recover the inputs provided to the small-scale farmers, at the time of buying the grain/seed. Recovery of such advanced support varies depending on the out-grower scheme provider and/or provisions contained in the written agreement. There are a few among the out-grower scheme providers interviewed, who do not effect input recoveries on small-scale farmers. The contract is based on a verbal assurance from small-scale farmers to supply the grain/seed, after harvest.

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<sup>5</sup> The other partner besides the farmer, in the Contract or Out-grower Scheme agreement, is not always a Processor, but could be any grain or seed buyer, e.g. Aggregator, Seed producer/company, Trader etc.

<sup>6</sup> The use of and dependency on lead farmers is largely necessitated in order to minimize the challenges of high transport costs for aggregation of crops and monitoring of small-scale farmers, who are located in isolated and remote areas.

The out-grower scheme providers interviewed recovered the input-support provided through the following means:

- ✓ direct cash deduction from the farmers' sales<sup>7</sup>; and
- ✓ payment in kind, e.g., supply of inputs equivalent; double the quantity of seed obtained; and 70% of inputs obtained.

The buying price is generally not indicated at the time of signing these contracts for the supplied grain/seed. Most of the small-scale farmers complained of not being paid a fair price. Most of the interviewed processors with out-grower scheme arrangements with small-scale farmers indicated that the written agreements do not state the buying price for the inputs. The key reasons cited for not stating the buying price in the written agreements were: (i) the agreements are entered into before the commencement of the marketing season, at which time the market conditions that will prevail during the marketing season are not known<sup>8</sup>, and (ii) the price may vary depending on the market forces, especially for cotton, whose price is determined by international markets. Some written out-grower scheme agreements, however, indicate the buying price. In contrast, the contract farming arrangements involving commercial or large-scale farmers usually have the buying price for supplied grain/seed stated in the written contract.

Out-grower scheme providers cited several challenges affecting the implementation arrangements. The following were the notable highlighted challenges:

- i). Non-compliance of small-scale farmers to some contractual obligations:
  - selling of produce to other buyers (i.e., side-selling): resulting in insufficient quantities of seed/grain for processing; difficulty in determining the need from year to year; and insecurity of markets.
  - defaulting in payments or poor loan recoveries.
- ii). Low crop yields and quality, leading to insufficient seed/grain for processing. Low crop yields and quality are due to various reasons, such as:
  - recycling of seed and poor agricultural practices by small-scale farmers;
  - effect of climate change-related events such as drought and floods on crop production; and
  - use of crop varieties with low oil-content.

Despite the above challenges, all the interviewed out-grower scheme providers indicated that they intend to continue with out-grower scheme arrangements.

### 3.2. Production Trends

The oil crop production sector in Zambia has undergone and continues to undergo changes. Overall, production output from oil crops has increased steadily over the last decade. A look at annual national production trends in the last ten-year shows that soybean has recorded the largest rapid increase in production, of nearly 500 per cent. Groundnut production has also steadily increased by approximately 130 per cent. Sunflower production has also been increasing with the largest growth seen in the 2018/19 season. Cotton seed, by contrast, has gradually been declining especially after a high in 2012 (See Figure 1).

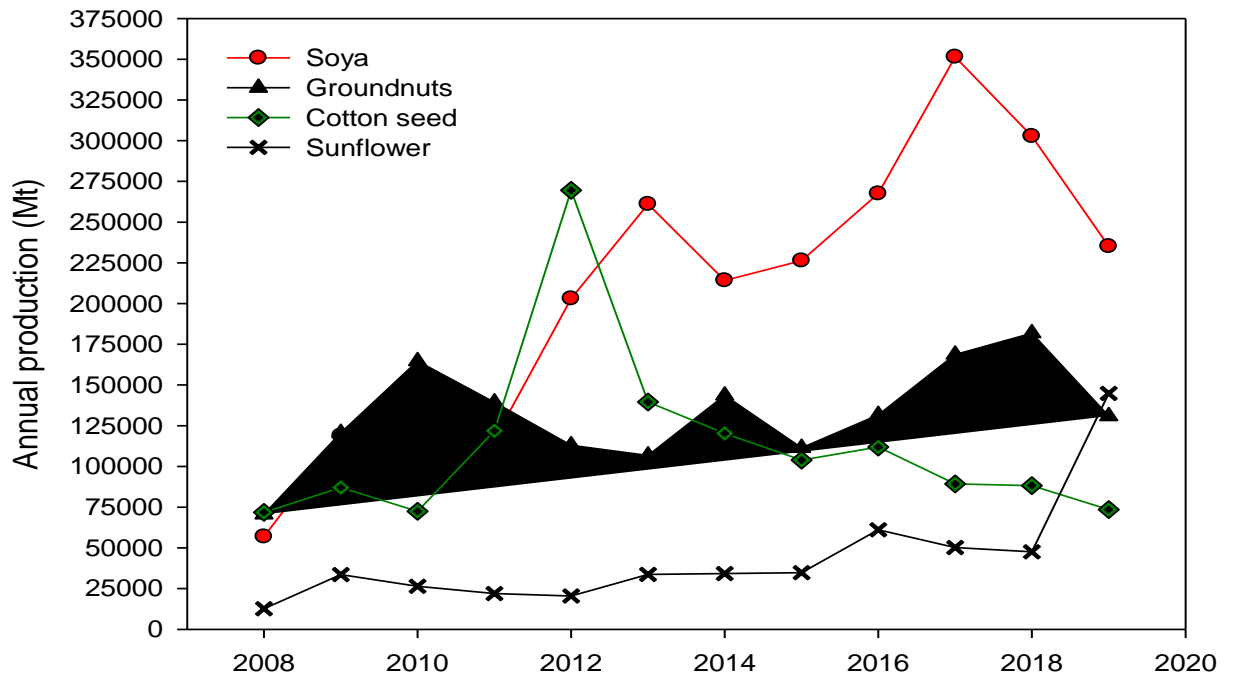
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<sup>7</sup> This is the most common recovery method among the out-grower scheme providers interviewed.

<sup>8</sup> For this reason, some contracts just stipulate that, out-grower scheme providers will be buying relative to the market price, during the marketing season.

There have been notable seasonal fluctuations in annual production in all the four crops. These, however, have been more evident in cotton seed and groundnuts. Most of the respondents attributed seasonal production fluctuations to volatile market prices. For example, since cotton prices are determined on the international market, prices tend to be quite volatile, unpredictable, and low. Likewise, the observed production trends for groundnuts, were attributed to low and unpredictable pricing across seasons. Consequently, production of oil crops in Zambia, now seems to be shifting away from dominance of groundnuts and cotton seed to soybeans. Since farmers are influenced by market prices to grow crops, uncertainty around commodity prices is an important factor in national production. Despite its potential as an oil crop, sunflower remains unexploited. In contrast, prices for soybean have consistently risen on local and global markets since the mid-2000s, which appears to be driving up production. Projections show that these trends are likely to continue even into the next decades.

**Figure 1: Annual Production of four Oil Crops commonly grown in Zambia from 2008 to 2019 (in Metric Tonnes)**



Data Source: ZamStats/MAL Crop Forecast Survey

### 3.2.1. Changes to area under oil crops in relation to annual production: 2008 - 2019

Major changes have occurred to area planted and production in the oil crops subsector in the last decade, in Zambia. Figure 2 shows the area planted and annual production trends from 2008 to 2019.

**Groundnuts:** Area planted under groundnuts has expanded by nearly 92% in the ten-year period, and followed a similar trend as production, which increased by 86%. Notably, there

was a reduction in area planted between 2010 and 2016, which corresponded with a production decline. Several respondents attributed the reduction in area planted to fewer small-scale farmers who grew groundnuts, due to among other factors, low market prices and low yields, driven by limited access to improved seed and poor rains. Poor access to quality seed, low rainfall and diseases were singled out as the most important challenges affecting groundnut production.

**Sunflower:** Area planted under sunflower expanded from 32,491 Hectares (Ha) in 2008 to 106,739 Ha in 2019, representing a 228% increase. Production followed a similar trend, although, the average production over the entire was period below 50,000 MT, except for 2016, 2017 and 2019 when it exceeded 50,000 MT. This increase in production corresponded with an expansion in area planted. Notably, between 2017/18 and 2018/19 agricultural seasons production increased by almost 100,000 MT (200%), because sunflower yields more than doubled from around 0.5 MT/Ha to 1.4 MT/Ha.

**Soybeans:** Area planted under soybean has been expanding rapidly as production has also increased. Between 2008 and 2019, soybean area grew from 32,404 Ha to 281,873 Ha, representing a 770% increase, with the largest growth occurring from 2016 to 2019. While production has followed a similar trend as area planted, it seems to have increased at a much lower percentage (i.e., 314%) when compared to area during the same period.

**Cotton seed:** There has been minimal growth recorded in area planted under cotton between 2008 and 2019. In fact, trends show that since a peak of 314,497 Ha in 2012, area under cotton drastically reduced to 140,089 Ha by 2019, representing a 121% drop. Cotton production trends followed a similar trend to area planted, although very little growth has occurred. Annual cotton production has been going down from a high of over 250,000 MT in 2012 to slightly below 100,000 MT in 2018.

### 3.2.2. Participation of farmers in oil crop production

The Zambia's crop production sector comprises small-scale, medium and large-scale (commercial) farmers. Small-scale farmers cultivate crops on less than five hectares of land, medium scale between 5-20 hectares and large-scale more than 20 hectares, according to the Government's categorization of farmers. The annual Crop Forecasting Survey (CFS) conducted by the Ministry of Agriculture and Central Statistical Office (CSO)<sup>9</sup> combines production data/figures for small- and medium-scale farmers; and the two are generally reported as figures for small-scale farmers.

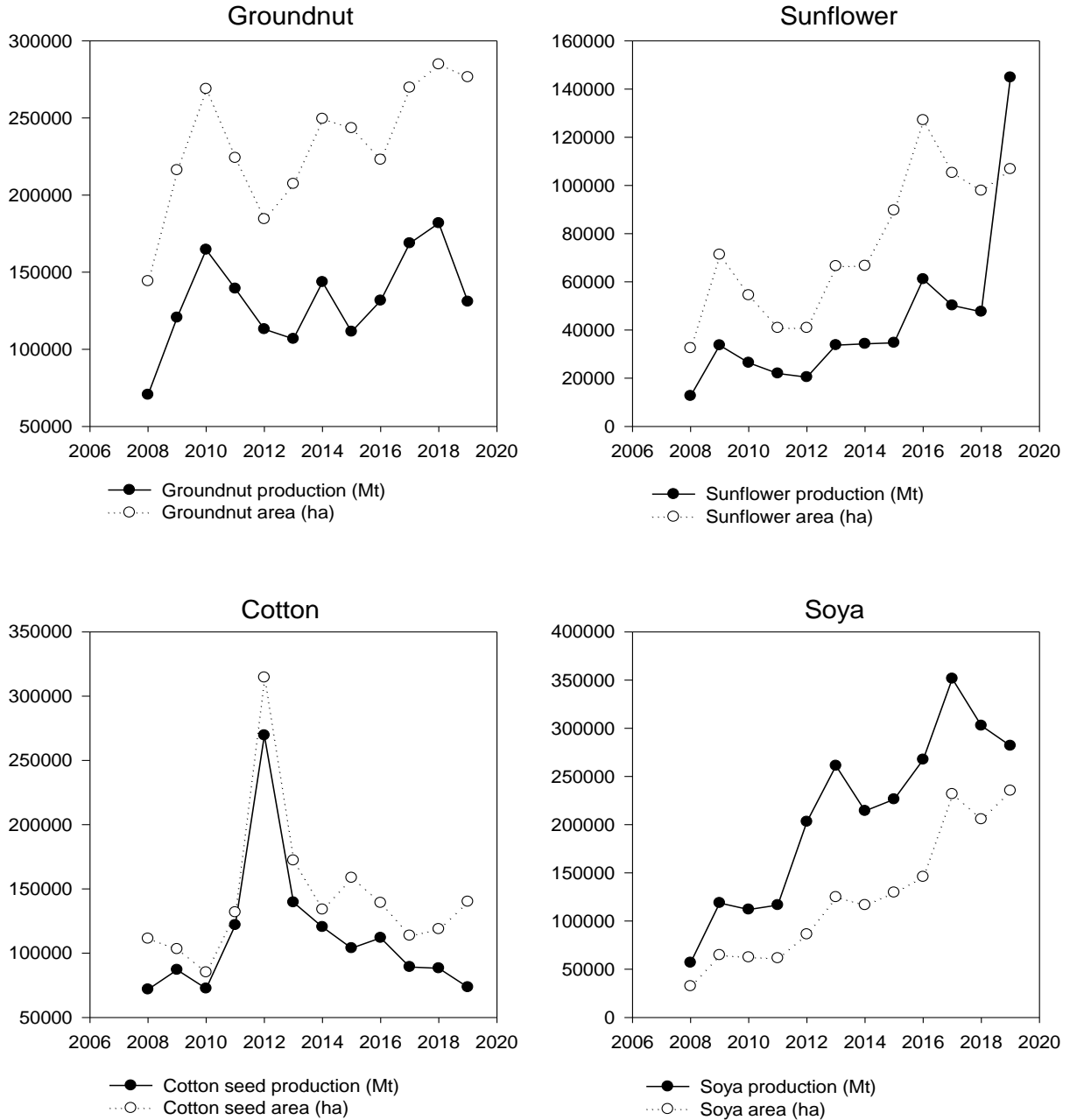
**Cotton seed:** As can be seen from Figure 3, small-scale farmers historically account for nearly all the cotton seed produced in the Country. It is estimated that there are about 300,000 small-scale farmers producing cotton, although over time this number has gradually reduced. The major mode of production has been through small-scale farmer out-grower schemes facilitated mostly by multinational ginning companies. These include Parrogate (formerly Cargil), Louis Dreyfus Company [LDC] (formerly Dunavant and NWK-Agri services), Mount Meru Millers Zambia, China Africa Cotton Zambia, Graffax, and Alliance Ginneries Limited.

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<sup>9</sup> The name of CSO has now changed to Zambia Statistics Agency (ZamStats)

Parrogate, LDC and Alliance Ginneries are the three major players involved in cotton. The findings established that they control 85% of cotton production in Zambia.

**Figure 2: Annual production of oil crops, in Metric Tonnes (MT), and area planted in hectares (Ha) from 2008-2019**



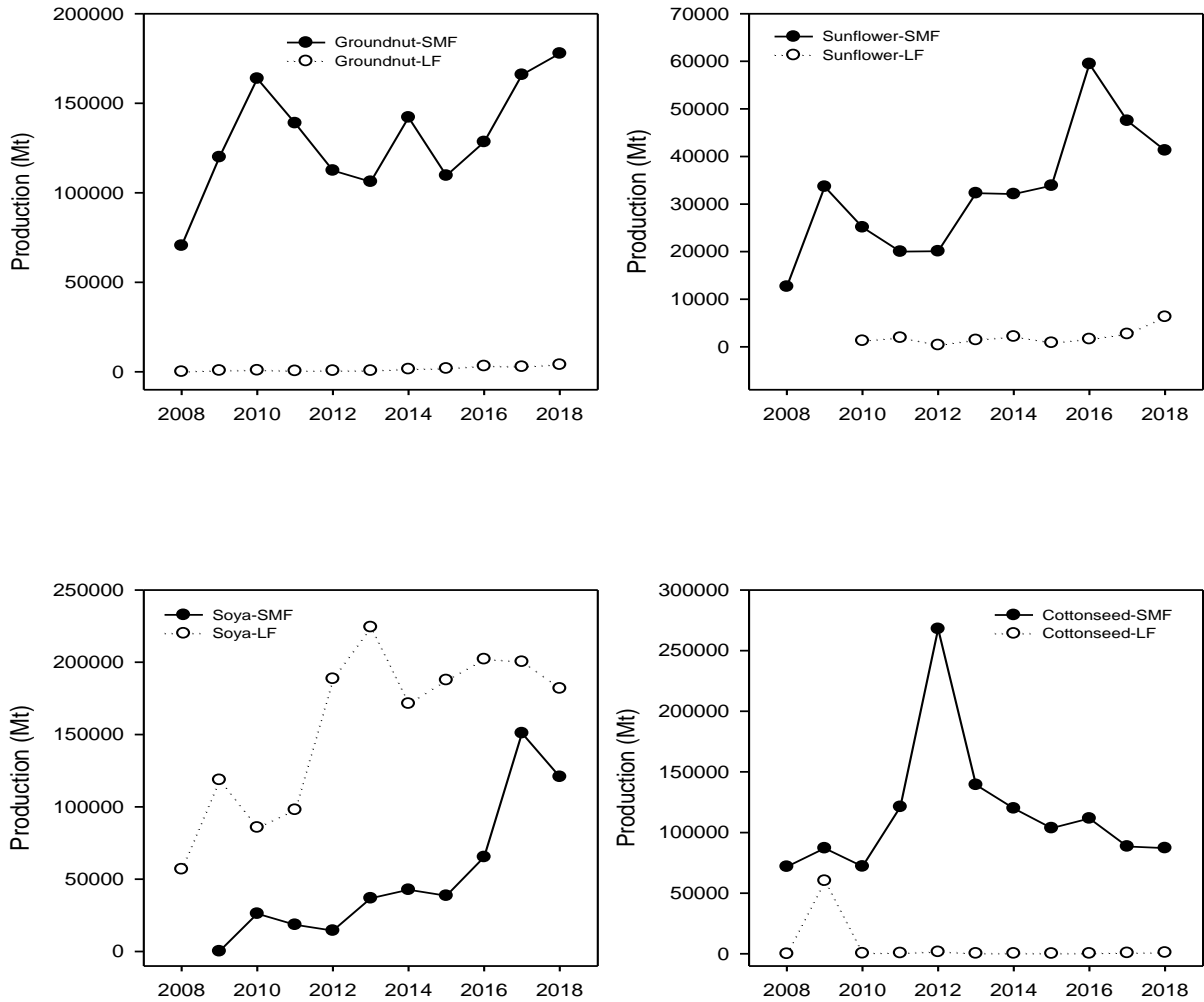
**Groundnuts:** Small-scale farmers have historically dominated production of groundnuts in Zambia. As can be seen from the ten-year CFS data in Figure 3, national production of groundnuts has greatly fluctuated especially between 2008 and 2015. A closer look at the production data reveals an effect on seasonal total national production due to variations at small-scale farmer level. Small-scale farmers account for nearly more than 95% of the groundnuts produced in Zambia, which are mainly grown in Eastern, Muchinga and Northern Provinces. After 2015 as production from small-scale farmers began to increase, total national production also steadily grew from about 100,000 MT to nearly 175,000 MT by 2018.

**Soybeans:** Large-scale farmers have dominated production of soybeans. More than 60% of all soybeans produced in the Country comes from large-scale farmers. Commercial soybean production has been increasing steadily from about 50,000 MT in 2008 to nearly 200,000 MT in 2018 (Figure 3). However, over time contributions from small-scale farmers have also been increasing. For example, from 2015, annual production by small-scale farmers increased from under 50,000 MT to a historical high of 150,000 MT in 2017, before it slightly dropped to around 125,000 MT in 2018. This, however, was not enough to supersede contributions from large-scale farmers. The production of soybeans throughout the ten-year period by large-scale farmers, although fewer in number, far exceeds that of small-scale farmers, who are more in number. This is largely because soybean yields by large-scale farmers are higher than those of small-scale farmers. A possible explanation is that, large-scale farmers implement better agronomic management practices, which improve their productivity compared to small-scale farmers. Other factors include financial capacity, mechanization, access to quality inputs, and irrigation. Thus, large-scale farmers are able to plant larger areas, get better yields and harvest large volumes/quantities.

Most of the soybeans is produced for direct sales to off-takers and traders. A considerable proportion of the crop, especially at large-scale farmer level, is grown through contract farming. A few small-scale farmers are also involved in out-grower schemes facilitated by companies such as Mount Meru Millers Zambia, 260Brands, and Amatheon Agri-Zambia.

**Sunflower:** Most of the sunflower is grown in Eastern, Central and Southern Provinces. Like groundnuts and cotton, sunflower production has mostly been dominated by small-scale farmers. The contribution of large-scale farmers to total sunflower production has been negligible over the whole period (Figure 3). There have been notable seasonal fluctuations in small-scale production similar to what is observed in other commodities, such as groundnuts and cotton.

**Figure 3: Annual Oil Crops' Production<sup>10</sup> by Small and Medium-scale Farmers (SMF) and Large-scale Farmers (LF) from 2008-2019 (in MT)**



Data Source: CSO/MAL Crop Forecast Survey

### 3.3. Aggregation and Processing

#### 3.3.1. Aggregation

Almost all the aggregators interviewed were involved in soybean grain aggregation. The majority of those who aggregate soybeans also dealt with groundnuts. Very few aggregators among those interviewed were dealing in sunflower and cotton seed. They all indicated sourcing their commodities predominantly from small-scale farmers.

Storage capacity varied greatly among the aggregators interviewed, with 300,000 MT reported as the highest storage capacity. However, on average most aggregators only manage to bulk less than 50% of this capacity with oil crops, i.e. soybeans, groundnuts and sunflower, while the rest is allocated to maize. Soybeans accounted for the largest proportion of storage

space allocated to oil crops. Most aggregators attributed failure to fill up their storage capacities to:

- i). Inadequate supply of the commodities by farmers;
- ii). Insufficient funds (capital) and cash-flow challenges;
- iii). Inability (low capacity) to mobilize the commodities from all farmers; and
- iv). Simultaneously selling of the commodities while aggregating.

Most of the aggregators sell their grains locally to oil seed crushers. There are mainly three (3) major local off-takers of the oilseed grain. These are mostly edible oil processors, namely, Global Industries Limited (with the largest crushing capacity), Mt. Meru Millers Zambia Ltd and Parrogate. A few aggregators reported exporting to Zimbabwe, Mozambique, Malawi, Tanzania, and South Africa.

### 3.3.2. Processing

#### Types of products processed from oil seeds and methods of oil extraction

The most common locally processed product from oil seed/grain is edible oils as refined cooking oil, followed by crude oil. Several processors also indicated importing crude oil, into the country, which is then locally refined into cooking oil. A few of the processors also produce semi-refined oils for sale. Besides processing edible oils, most processors also produce one or more other food products from the oil crops. The other processed products include: cake (soybean, sunflower and cotton), livestock feed (e.g., poultry, pig, and fish), soybean meal, full-fat soya, and peanut butter. A few processors also produce snacks, chunks, beverages, and high-protein supplements from soybeans.

The most common method of oil extraction used by edible oil processors is mechanical pressing. There are a few among the interviewed edible oil processors who use solvent extraction.

#### Processing capacity

The current total crushing capacity of edible oil processors is estimated to be about 800,000 MT per year and is increasing to one million metric tons per year. The three major processors, i.e. Global Industries Limited<sup>11</sup>, Mt. Meru Millers Zambia Ltd and Parrogate, account for the largest proportion of the current total crushing capacity. The number of small and medium-scale processors, especially of soybeans, sunflower and groundnuts, is also growing: processing a range of products such as cooking oils, cake, soy milk and soya chunks.

The majority of the Processors interviewed stated that Zambia's edible oils' processing capacity is not enough to meet the current consumption levels; with fewer reporting that there is more than enough capacity. However, the reported figures of the installed processing capacity are higher than the capacity at which the processors are currently processing. Most processors are not processing edible oils, including other oilseed products, at full installed capacity.

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<sup>11</sup> The current installed Global Industries Ltd.'s crushing capacity of soybeans is said to be 360,000 MT per year.



The main reason for not processing at full installed capacity is reportedly the inadequate or low supply of raw materials, by farmers. Few other processors also mentioned inadequate financial capacity and limited local market or demand for other processed products, such as cake, livestock feed and full-fat soya, as additional limiting factors to process at full capacity<sup>12</sup>. For example, some processors reported that their current operating capacity was at 60% of installed capacity for edible oils, cake, and livestock feed. Consequently, the monthly quantity of feedstock (raw material) requirements to process at full capacity exceed the supply.

This study, therefore, establishes that there is adequate installed capacity to process oil crops into edible oils and other products to meet national consumption levels. The major constraints are low feedstock supply and illegal imports (smuggling) of refined oils on the local market.

However, another challenge highlighted by processors, if processing increases to one (1) million metric tonnes per year to meet the current edible oils consumption requirements<sup>13</sup>, is that there would be excess production of soybean cake/meal which the local market cannot consume because demand is low. Nearly, 75% of crushed soybean is soybean meal and 15 to 18% goes into edible oils. While some processors export surplus soybean cake/meal to other countries, e.g., South Africa and Namibia, they face challenges in accessing these markets (See sub-section 3.4.4.2 for export constraints). Consequently, this would flood the local market with soybean meal, which would push the prices for soybean down. A reduction in prices would therefore be a disincentive for farmers to grow soybeans.

### 3.4. Marketing and Trading

#### 3.4.1. Domestic Market and Trading

Among the respondents interviewed in this study, the majority mentioned trading domestically in grains and seeds, followed by cake/meal. A few respondents indicated trading in edible oils, mostly processors (Figure 4). There seems to be a higher number of value chain players trading in grains and seed compared to those involved in other processed products and edible oils products.

##### 3.4.1.1. Local Transaction Types and major Local Markets

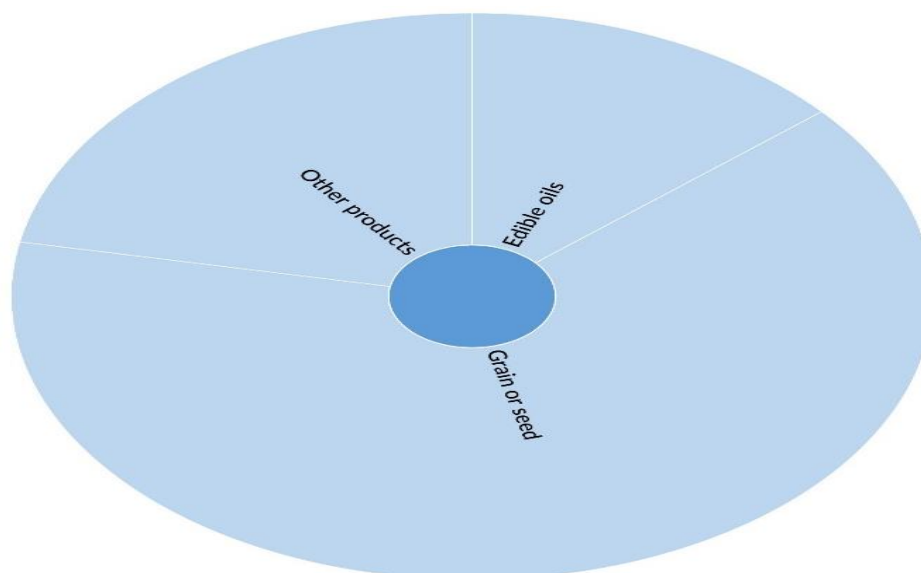
Domestically, the trading of oil crops and their processed products was reported as predominantly transacted in cash (on delivery or collection). However, there are a few cases of payments by cheque, bank transfer, as well as credit transactions, such as payments within 2 weeks or after a month (especially for civil servants). Credit payments are generally accorded to commercial farmers; also including other trading arrangements like three (3) months agreement, prepayments, and forward contracts. Generally, the specific payment method depends on the buyer and/or seller.

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<sup>12</sup> Consequently, most processors of cake, livestock feed and full-fat soya are producing at lower capacities just to meet existing local demand.

<sup>13</sup> The current edible oils national crushing requirements is 170,000MT/Year of oil), while the current national demand for soybean meal is 100,000MT/Year

**Figure 4: Domestic Market-share of various oil crop products**



*Data source: Author's compilation from interview data*

Most of the oil crops and products are traded locally. The local market arrangements for harvested grains/seeds include farm-gate sales (village-level), open (public) markets and at bulking centers within districts and major towns along trade corridors leading to Lusaka. However, some traders sell at both local and foreign markets, although local trading still accounts for a larger proportion of the traded commodities. Processed products, e.g., refined edible oils, peanut butter, soya chunks, soybean meal and cake, cotton cake, and sunflower cake, etc. are sold at different market segments, such as open markets (e.g., Kasumbalesa, Soweto and Chisokone), chain stores (e.g., Shoprite and PicknPay), wholesalers, retailers, aggregators, middlemen/traders, distributors, NGOs, processors (e.g., livestock feed and food processing companies), and local livestock farmers, etc.

#### 3.4.1.2. Reasons for not meeting local market demand

The study found that most processors are unable to meet the local demand for edible oils and other products. The following were the key challenges identified for failure to satisfy the market demand:

- a) Inadequate supply of raw materials. There is a general challenge of aggregating raw materials especially in remote areas due to poor road, and telecommunication network infrastructure. There was a general observation that commercial farmers have switched to growing other crops such as wheat because prices for soybeans are no longer attractive. This is because the Government has been promoting soybean growing among small-scale farmers through subsidies, which processors buy at lower/cheaper prices. Flooding of the local market with imported refined edible oils, which sometimes are illegally smuggled into the country. Consequently, these edible oils are sold locally at a lower price compared to those locally produced. This creates unfair advantage (competition) in the market.

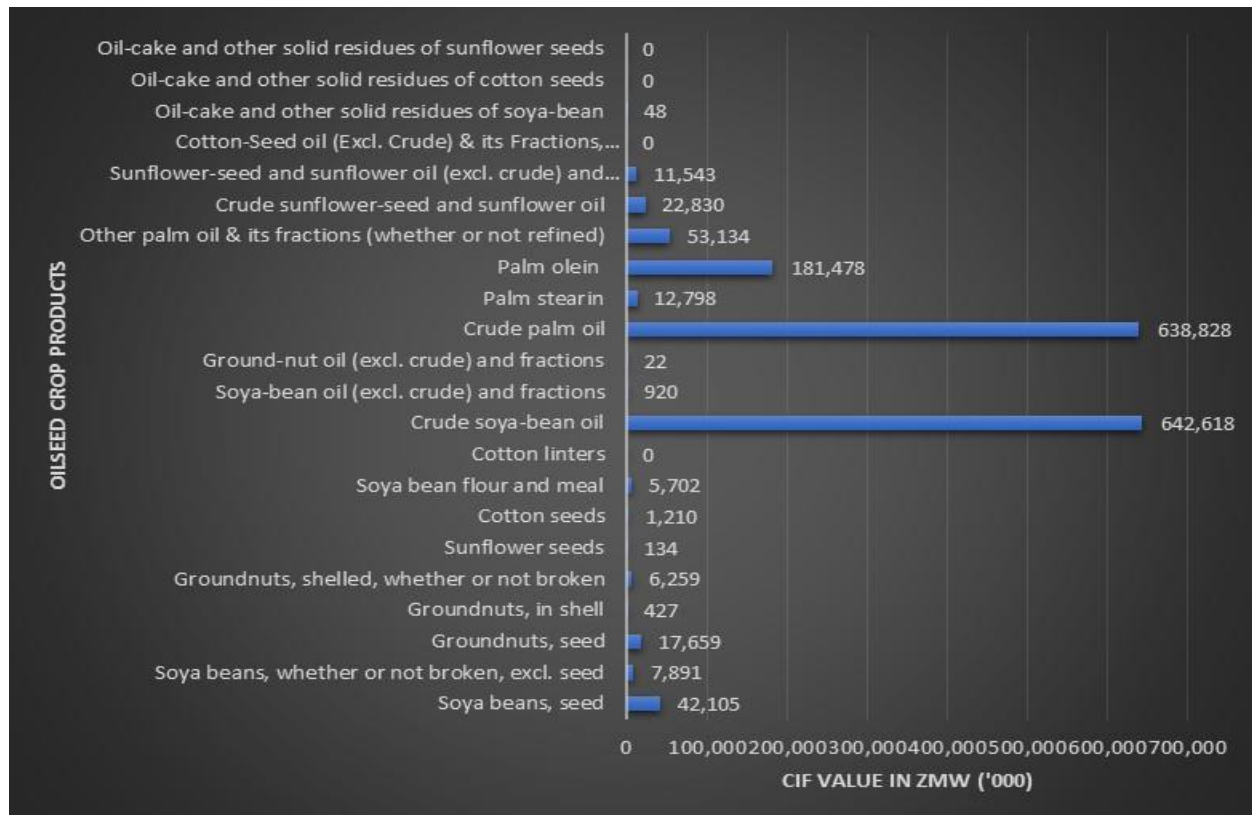
- b) Capacity to utilize other processed by-products, such as cake, is low. Thus, the processor drastically reduces the quantity of soybean crushed into edible oils to avoid flooding the market with the by-product, which would reduce the price. Some processors are not able to source the raw materials due to unfair competition in the local market.
- c) Some processors have inadequate or lack finances to buy sufficient quantities of raw materials to meet their installed processing capacity.
- d) Unstable electricity power supply affects processing.

### 3.4.2. Foreign Trading

#### 3.4.2.1. Imports

Several respondents who included processors, government officials, marketers, and aggregators indicated that local oil crop production is not adequate to meet the country’s edible oil consumption. This is despite the country having enough installed processing capacity for edible oils (see sub-section 3.3.2). The shortfall is however, met through imports. For example, crude soybean oil and crude palm oil accounted for the largest imported edible oil products into Zambia in 2020 (See Figure 5 and Table 3). The country spent K643 million (US\$35.44 million) and K639 million (US\$35.39 million) on crude soybean oil and crude palm oil imports in 2020, respectively.

Figure 5: Value of Imported Oil Crop Products in 2020 (Jan-Nov)



Data Source: Zambia Statistical Agency (ZamStats)

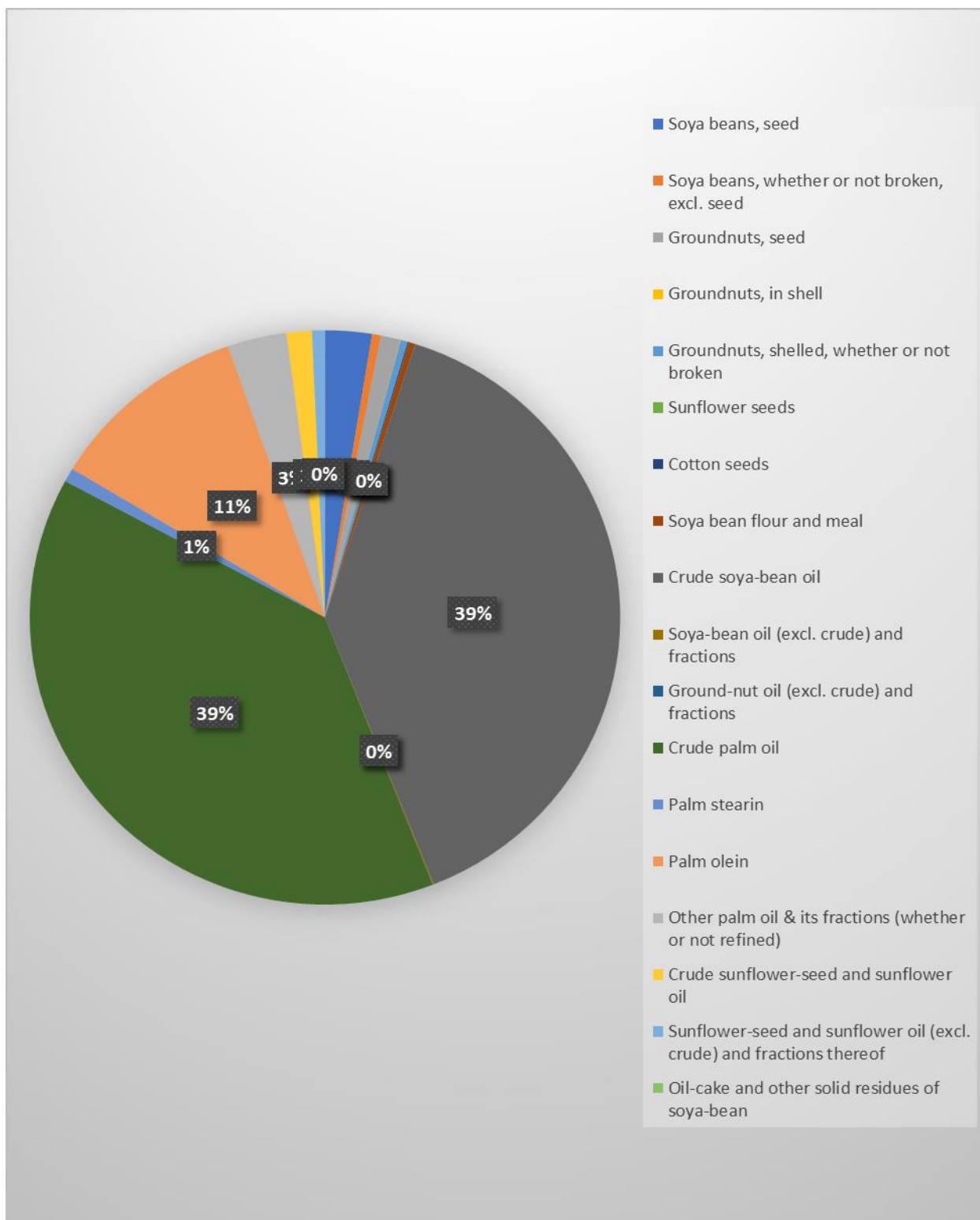
*Table 3: 2020 Zambia's Imports and Exports of Oilseed Products by Quantity*

Commodity	Total Quantity (MT)	
	Imports	Exports
Cotton seeds	34.50	18,319.83
Cotton seed oil (excl. crude) & fractions	-	1,570.14
Cotton seed oil-cake & other solid residues	-	7,697.36
Groundnut seed	421.65	802.52
Groundnuts-unshelled	65.81	238.40
Groundnuts-shelled	587.26	343.47
Crude palm oil	36,155.85	254.30
Palm stearin	725.17	632.65
Palm olein	13,525.07	1,569.99
Other palm oil	3,853.11	2.39
Soyabean seed	881.96	3,219.78
Soyabean, excl. seed	510.02	11,332.57
Soyabean flour and meal	179.80	28,510.96
Crude soyabean oil	38,524.69	0.14
Soyabean oil (excl. crude) & fractions	6,574.13	1,183.47
Soya sauce	1,188.72	-
Soyabean oil-cake & other solid residues	35.70	81,204.68
Sunflower seeds	1.81	47.00
Crude oil sunflower & safflower oil	1,278.30	1.46
Sunflower & safflower oil (excl. crude) & fractions	306.10	1,136.82
Sunflower oil-cake & other solid residues	-	8,031.92
<b>Total</b>	<b>104,849.65</b>	<b>166,099.85</b>

Source: ZamStats

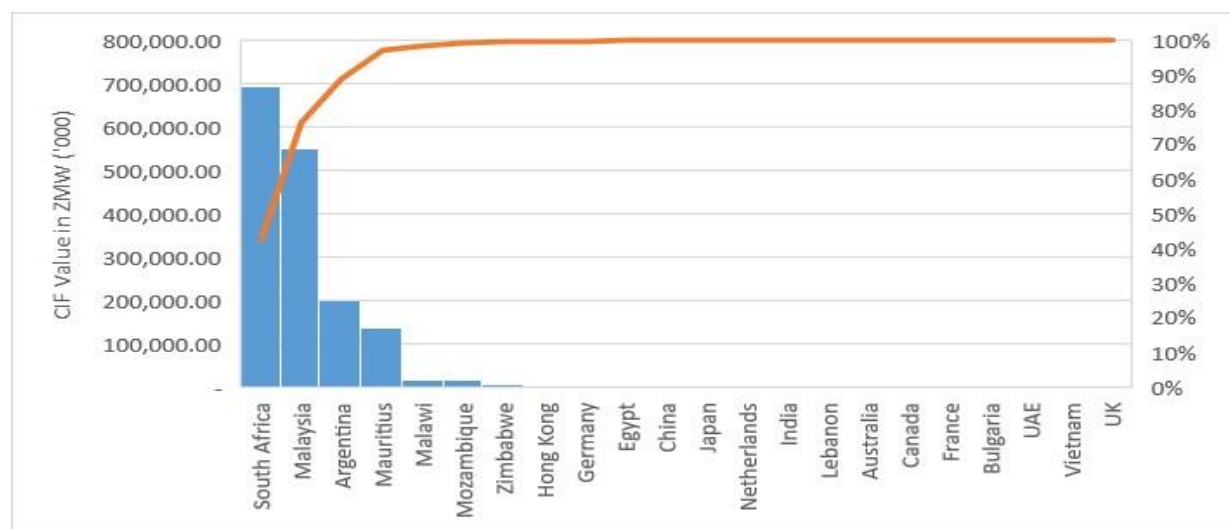
As shown in Figure 7, in 2020 South Africa was the major import source for most oilseed products, followed by Malaysia, Argentina and Mauritius. The three (3) major imported products were crude soybean oil, crude palm oil and palm olein. Crude soybean oil mostly came from South Africa, Argentina and Mauritius; while Malaysia, South Africa and Mauritius were the main sources for imported crude palm oil. Palm olein mostly came from South Africa and Malaysia (Table 4). However, from the interviews conducted, most respondents pointed out that these three products were actually imported from Argentina, Mauritius and Malaysia and not from South Africa. South Africa was instead used as the transit country.

Figure 6: Proportion of Imported Oilseed Products by value, in 2020



Data Source: ZamStats

Figure 7: 2020 Total Import Value of Oil Crop Products by Country



Data Source: ZamStats

**Effect of imported edible oils, oil-crop seeds, and other oilseed food products on the domestic market for edible oils:** In order to meet the shortfall on local supply or normal participation in international trade, edible oils, seeds and other oil crop processed commodities are imported into Zambia from other countries. According to several respondents, imports affect the oil seed domestic market in different ways.

Some of the positive effects of imports mentioned by the respondents include:

- i). imports help to meet local demand;
- ii). Imported products such as edible oils tend to be cheaper than locally processed products, which help to stabilize prices. The cost of local processing is high, thus without imports, edible oils would be very expensive. Therefore, imports make edible oils more affordable for consumers due to competition.

Some of the negative effects of imports mentioned by the respondents include:

- i). Imported branded products are preferred by consumers. This has reduced the demand for locally processed products, as they are perceived to be of low quality;
- ii). Since imported products generally tend to be cheaper, there is less demand for local processed products. This, in turn, depresses the demand for local raw materials, thereby plummeting the incentive of local farmers to produce oil crops. Buyers offer lower prices for grain, which discourages farmers. Ultimately, all these factors lead to decreased local production of oil crops.
  - The spiral effect of reduced demand/market for local oilseed processed products, in the long run, may lead to reduced local processing capacity or closure of some local processing industries; and may ultimately result in loss of jobs, locally.

**Table 4: Cost Insurance & Freight (CIF) Value ('000) of major imported oil crop commodities in four top countries in 2020**

Imported Commodity	South Africa		Malaysia		Argentina		Mauritius		Commodity Total	
	ZMW	US \$	ZMW	US \$	ZMW	US \$	ZMW	US \$	ZMW	US \$
Crude soya-bean oil	348,888	19,355	18,699	1,203	194,452	10,627	80,580	4,258	642,618	35,443
Crude palm oil	70,270	3,724	503,723	28,253	6,225	339	56,366	2,945	636,583	35,262
Palm olein	137,585	7,682	22,607	1,219	0	0	0	0	160,192	8,901
Soya bean flour & meal	0	0	33	2	0	0	0	0	33	2
Palm stearin	5,813	333	6,538	353	0	0	0	0	12,351	685
Soya beans seed	36,202	1,845	0	0	0	0	0	0	36,202	1,845
Soya beans (broken or not) excl. seed	2	0.09	0	0	0	0	0	0	2	0
Groundnuts' seed	16,980	831	0	0	0	0	0	0	16,980	831
Groundnuts-unshelled	3	0.14	0	0	0	0	0	0	3	0
Groundnuts-shelled (broken or not)	2	0.12	0	0	0	0	0	0	2	0
Sunflower seeds	123	7	0	0	0	0	0	0	123	7
Soya bean flour & meal	3,906	249	0	0	0	0	0	0	3,906	249
Soya-bean oil (excl. crude) & fractions	570	32	0	0	0	0	0	0	570	32
Groundnut oil (excl. crude) & fractions	16	1	0	0	0	0	0	0	16	1
Other palm oil & its fractions (refined or not)	48,120	2,624	0	0	0	0	0	0	48,120	2,624
Crude sunflower-seed & safflower oil	22,830	1,216	0	0	0	0	0	0	22,830	1,216
Sunflower-seed & safflower oil (excl. crude) & fractions	1,770	99	0	0	0	0	0	0	1,770	99
Soya sauce	393	22	0	0	0	0	0	0	393	22
Cotton, not carded or combed	17	1	0	0	0	0	0	0	17	1
Cotton, carded or combed	16	1	0	0	0	0	0	0	16	1

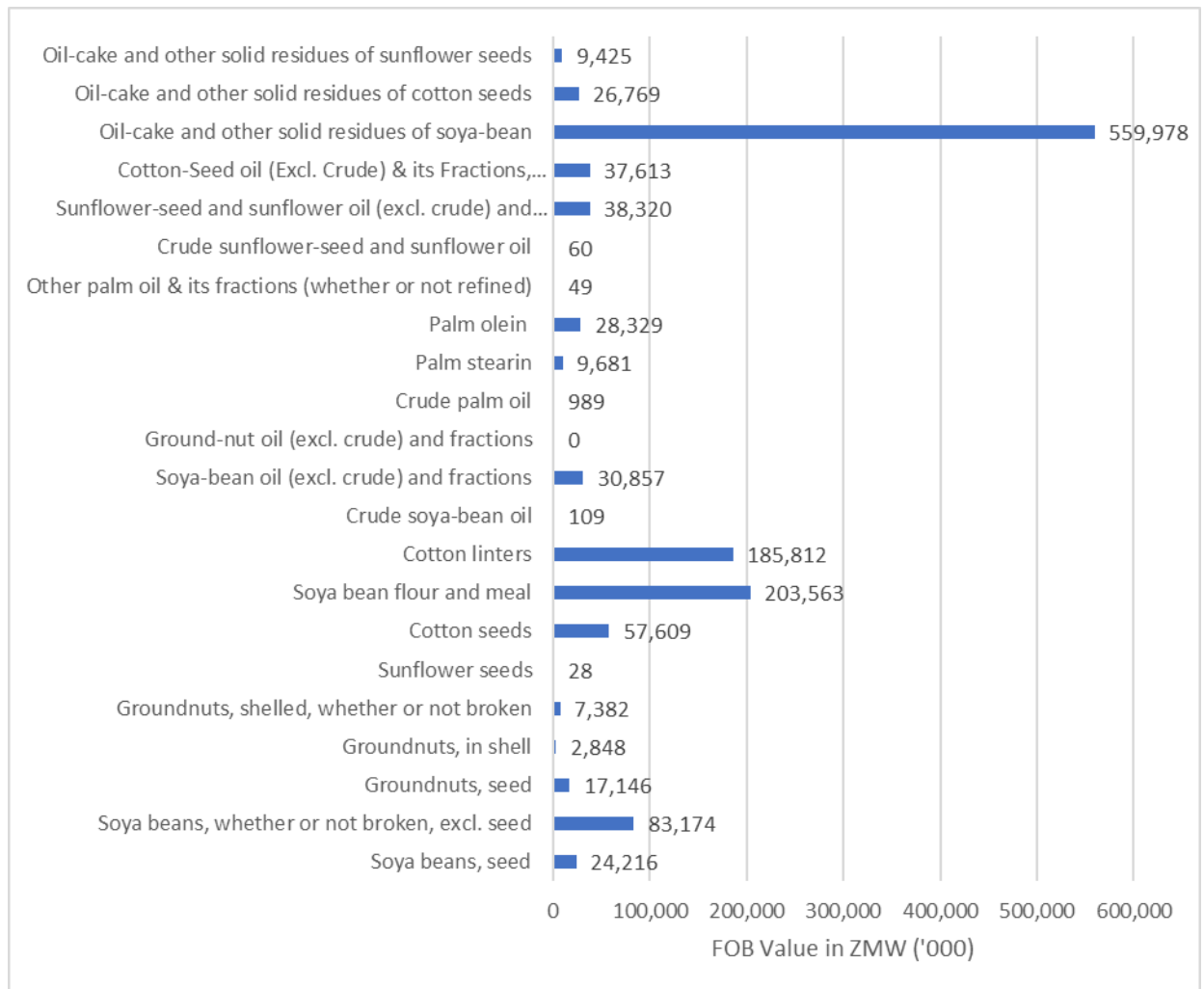
Source: ZamStats

- iii). High cost of local production disadvantages Zambian oilseed processing industries in competing with cheaper imported products. Local manufacturers are adversely affected; lowering the capacity or desire to process locally.
- iv). Illegal imports of refined edible oils disguised as crude oil. Most processors attributed this to MoA issuing crude oil import permits to players who do not have processing (refining) facilities and instead, end up importing refined oils.

#### 3.4.2.2. Exports

In 2020, soybean cake (worth about K560 million) was the dominant oilseed export commodity followed by soybean flour and meal, and cotton seed, respectively (Figure 8 and see also Table 3). According to the responses from key informant interviews, this has been the trend even in other years. The major export destinations are South Africa, Botswana, Namibia and Zimbabwe.

**Figure 8: Value of Exported Oilseed Crop Products in 2020 (Jan-Nov)**

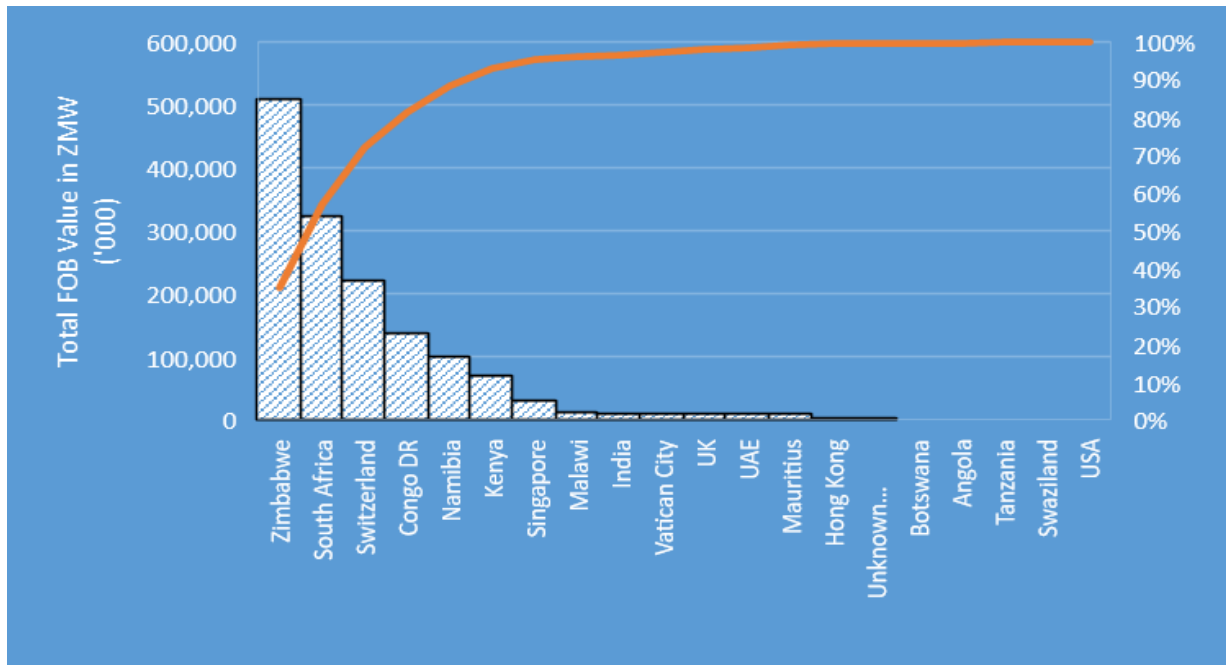


Data Source: ZamStats



The top five export destination countries for various oil crop products in 2020 by value were Zimbabwe, South Africa, Switzerland, Democratic Republic of Congo, and Namibia, respectively (Figure 9). As expected, soybean cake was the major export commodity, exported to three out of the five countries (Table 5).

Figure 9: 2020 Total Export Value of Oilseed Crop Products by Country



Data Source: ZamStats

Table 5: Major Oilseed Commodities exported in the Top five Export Countries in 2020, by Value ('000) 1

Exported Commodity	Zimbabwe	South Africa	Switzerland	Congo DR	Namibia	Total
	ZMW (FOB)	ZMW (FOB)	ZMW (FOB)	ZMW (FOB)	ZMW (FOB)	ZMW (FOB)
Soya bean oil				30,857		30,857
Soya bean flour and meal	202,756					202,756
Soya bean oil-cake	212,709	58,520			97,414	368,643
Cotton, not carded or combed		120,166	113,712			233,878
Cotton linters		47,790	108,116			155,906
Cotton oil-cake					916	916
Cotton seeds	37,480					37,480
Cotton seed oil				37,613		37,613
Sunflower seed & sunflower oil				38,314		38,314
Sunflower oil-cake					1,533	1,533

Source: ZamStats

### 3.4.3. Export market opportunities and constraints

The export market for oil crop seeds and processed products offers some opportunities and constraints to various oilseed value chain actors. The respondents identified the following key opportunities and constraints for export markets.

#### 3.4.3.1. Opportunities

- i). There is readily available market with good prices for oil crops and products within the region and globally. The demand for Zambia's oil crop products is high because the country produces non-genetically modified seeds. For example, there is high demand for edible oils in DRC, and cake in Namibia, Botswana, and South Africa (due to a high population of livestock).
- ii). Zambia has favourable weather conditions, enough arable land, and a good number of farmers (particularly small-and medium-scale farmers) for the production of oil crops.
- iii). Several varieties of oil crops have been bred and released.
- iv). The country has adequate installed processing capacity for oilseed crops into edible oils and other products, with potential to export surplus production to outside markets.
- v). Export markets provide an opportunity to earn foreign currency.
- vi). In case of local market failure, export markets provide an alternative market.
- vii). Zambia's central geographical location in the Eastern and Southern African Region, and surrounded by eight countries, provides an opportunity for cross-country trade.

#### 3.4.3.2. Constraints

- i). Production and productivity are low due to, among other challenges, lack of mechanization among small-scale farmers, and insufficient supply of quality seed.
- ii). Some processed products do not meet international standards for export e.g., high aflatoxin levels in groundnuts and associated products. Unfavourable and inconsistent government policy measures such as export bans, which affect planning by market players. There are no policies that specifically support export of processed products. Instead, there is much focus on the local markets.
- iii). The centralized issuance of export permits creates bureaucracy and leads to alleged corruption.
- iv). High production, processing and transportation costs, including high foreign taxes, make Zambian products on the export market uncompetitive (i.e., expensive).
- v). Different rules and documentation processes across countries make it difficult to access export markets.
- vi). There is inadequate information on export market requirements, e.g. on branding, thereby limiting access to export markets.
- vii). There are language barriers at some border markets, such as Kasumbalesa in the DRC, which middlemen use to exploit local suppliers.

#### 3.4.4. Formal and Informal Trade Dynamics

It was reported that there is a lot of illegal trade which allows for smuggled cooking oil to come into the Country. Many local traders buy and sell this illegal cooking oil cheaply, which

creates less demand for local cooking oil. The findings further show that refined cooking oil is smuggled into the Country by disguising and declaring it as crude oil, because crude oil attracts less import levies/taxes.

There are also substantial quantities of other oilseed products besides edible oils, e.g. cake, seed, grain, and peanut butter, that are exported illegally to neighboring countries, such as Malawi, Tanzania, DR Congo, Botswana and Mozambique; including South Africa (via Malawi and Mozambique). This is because buyers in these countries offer more competitive prices compared to Zambia; and the porosity of borders with these countries, aids the informal trade.

The illegal trade has proliferated, which most respondents attributed to corruption during the issuance of export permits. The bureaucracy involved in obtaining export permits drives some traders into avoiding the process altogether, and trade informally/illegally.

### 3.5. Consumption and Utilization

#### 3.5.1. Consumption and Industrial Utilization

Based on the interviews, the current national edible oils consumption was reported to be about 10,000 to 12,000 MT per month<sup>14</sup>. However, only 40% to 50% of this demand is met from local processing, because of inadequate raw materials. This is because oil crop production is low and the oil content of most seeds used is low, e.g., the oil-content of soybeans is 17% and sunflower is 28%. To meet the national consumption demand, the Country crushes 3,500 MT/month of grain/seed and imports about 10, 000 MT/month crude palm and soybean oil. In order to satisfy the current national demand for edible oils, the Country needs to crush about one (1) million Metric Tonnes of soybeans per year.

The current national demand for soybean meal/cake is said to be 100,000 MT/Year. This demand is not enough to take up all the soybean meal that is produced or can potentially be produced, if processing is at full capacity. According to the processors interviewed, from the reported national production of about 300,000 MT/Year of soybean, 15,000 to 20,000 MT/Year of sunflower and 50,000 MT/Year of cotton seed, 100,000 MT of soybean is used for human food and full-fat soya production. It is estimated that 75% to 80% of the total quantity of soybean crushed ends up as cake/meal, which is supplied locally, with the surplus exported to other countries, e.g., South Africa and Namibia. The 15% to 20% of the crushed soybeans is what ends up as edible oil.

As already pointed out under Sub-section 3.3 (Processing Challenges), with the limited demand for soybean meal/cake, the problem is or would be where to sell the meal/cake domestically, if crushing of soybeans is or were to be increased to meet the current domestic demand for edible oils. Because of this challenge, some processors, particularly those who solely produce soybean meal/cake, are compelled to process below their full installed capacity, to just meet the local demand for meal/cake.

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<sup>14</sup> The annual edible oil consumption demand is estimated to range from 170,000 to 200,000 MT/Year.

### 3.5.2. Nutrition

Most of the respondents interviewed reported a positive impact on their nutritional needs through the consumption of various processed oil crop products. The direct consumption of processed oil crop products, such as pounded groundnuts (flour), peanut butter, soy meal, soy chunks, soy sausages and cooking oil, were attributed to improved nutrition especially for children. However, the major challenge faced by most respondents interviewed (particularly small-scale farmers) is that they do not have processing equipment for soybean, sunflower, and cotton. Consequently, they depend on local processors to process their produce.

### 3.5.3. Livelihoods

In terms of improvement in livelihoods, the majority of respondents interviewed reported an increase in incomes generated from the production of oil crops. The respondents reported that from the money raised by selling the oil crops grown, they are able to meet a number of their livelihood needs, such as school requirements, building and improving houses, acquiring better modes of transport (bicycles, motor bikes), etc. Women who grow sunflower and groundnuts reported earning higher incomes. However, small-scale farmers face challenges in bargaining for better prices with vendors/middlemen who go to their farms because: (i) they produce and sell in smaller quantities/volumes, and (ii) most of them do not have the capacity to transport the produce to places that offer better prices for their produce, hence the middlemen dictate the price as they have to transport the produce.

### 3.5.4. Opportunities

There are opportunities in the oilseed subsector that can be exploited to improve the farmer's socio-economic status. Examples cited by the interviewed respondents include:

- ✓ value-addition to the oil crops can enable more income-generation;
- ✓ investment in processing equipment (e.g., expellers and extractors) would enable small-scale farmers to retain the cake (after cooking oil extraction), which can be fed to their own livestock or sold for extra income;
- ✓ the oilseed sub-sector offers a more consistent and ready market, hence farmers are assured of selling their produce; and
- ✓ the policy environment in this subsector is still fairly conducive and enabling.

## 3.6. Service Value Chain Functions

### 3.6.1. Trade Policy Regulations and Legal Framework to support the value chain

The study respondents were engaged to find out their knowledge about the existing policies, procedural regulations, mechanisms, and legal provisions for engaging in foreign trade involving oilseed crops and associated processed products. The focus was on ascertaining their understanding of the import regulatory framework, systems, and mechanisms.

Most of the concerned respondents<sup>15</sup> interviewed were quite knowledgeable about the existing import regulations, mechanisms, and systems. For example, they indicated that imported commodities are certified to meet Zambia's standards and specifications (regulations) including rules of origin for the Southern African Development Community

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<sup>15</sup> In the category of Government and Quasi-government Officials, and Marketers.

(SADC) and Common Market for Eastern and Southern Africa (COMESA). A few respondents, however, were not aware or not sure about the existing regulatory framework on importation of oil seeds and products.

### **Certification and Regulating Institutions**

The respondents were asked to identify relevant institutions in Zambia that play a key role in facilitating trade in the oilseed subsector. The following institutions were identified as being responsible for certification and regulation of imported oil seeds and processed products:

- a) Ministry of Agriculture (MoA):
  - i) *Department of Agribusiness and Marketing (ABM)*: for issuance of import and export permits (for agricultural products);
  - ii) *Zambia Agricultural Research Institute (ZARI) i.e., Plant Quarantine and Phytosanitary Services (PQPS)*: for provision of services to prevent the introduction and spread of exotic plant pests into the country while facilitating safe international trade of plants and plant products;
  - iii) *Seed Control and Certification Institute (SCCI)*: for regulation and control of import and export of seeds, seed quality control, and issuance of seed seller's licenses.
- b) Ministry of Commerce Trade and Industry (MCTI):
  - i) *Zambia Compulsory Standards Agency (ZCSA)*: for monitoring and ensuring compliance to compulsory standards in order to safeguard public safety and health, consumer protection and environmental protection.
  - ii) *Zambia Bureau of Standards (ZABS)*: for developing standards and providing conformity assessment services to industry.
- c) Zambia Revenue Authority (ZRA): for facilitating trade through collection of appropriate tax on imported and exported goods.

With regard to which specific institution certifies the various imported oil crop products in meeting Zambia's standards and specifications, several respondents showed more awareness of ZABS and not ZCSA. This is an indication that most respondents are not aware that after the repealing of CAP 416 Act of 1994, ZABS<sup>16</sup> is no longer responsible for the enforcement of compulsory standards. The role of administering, maintaining and ensuring compliance with compulsory standards now falls under ZCSA, which since 2018 is mandated to implement the Compulsory Standards Act No. 3 of 2017.

### **Implementation Mechanisms and Regulations for importation of oil seeds and products**

With regard to awareness of the existing implementation mechanisms and regulations in Zambia for the importation of edible oils, oilseed and grain, and other food products, the interviewed respondents indicated the following:

- i) Issuance of import and export permits by the MoA through ABM. This is implemented under the Control of Goods Act 2003, Volume 23, CAP 421.
- ii) Provision of services aimed at preventing the introduction and spread of exotic plant pests into the Country while facilitating safe international trade of plants and plant

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<sup>16</sup> ZABS now implements the Standards Act No. 4 of 2017 of the laws of Zambia, under which it is responsible for developing standards and providing conformity assessment services to industry: more focused towards supporting industry to implement standards that enhance the quality of products and services for industry growth and competitiveness.

products. The MoA implements this through ZARI's PQPS and is governed by the Plant Pests and Diseases Act CAP 233 and the Noxious Weeds Act CAP 231 of the Laws of Zambia. Through this legislation, PQPS<sup>17</sup> issues plant import permits and phytosanitary certificates to importers/exporters of agricultural commodities.

- iii) Regulation and control (through various testing and release) of import and export of seed, seed quality control, production and marketing of seed, including the coordination of the seed industry. These functions are implemented by the MoA through SCCI using the Plant Variety and Seeds Act, CAP 236 of the laws of Zambia.
- iv) The MCTI performs the following functions under the Compulsory Standards Act No. 3 of 2017, through the ZCSA which is a Statutory Body:
  - ✓ administering, maintaining and ensuring compliance with compulsory standards, for the purpose of public safety and health, consumer protection and environmental protection;
  - ✓ issuance of premarket approval for high-risk commodities falling within the scope of compulsory standards; and
  - ✓ conducting market surveillance for products falling within the scope of compulsory standards in order to monitor post-market compliance of commodities with compulsory standards.
- v) Facilitation of trade through collection of appropriate tax revenue on imported goods. This is implemented by ZRA (a semi-autonomous body under the Ministry of Finance) under the Zambia Revenue Authority Act No. 28 of 1993 CAP 321 of the Laws of Zambia.

### 3.6.2. Logistics and Trade/Transport Costs

This study found that logistical and transport costs are a challenge for most small and medium-scale farmers, and aggregators. These impact on their capacity to commercialize, expand, and enhance performance of the oilseed subsector.

#### **Transport costs**

The small-scale farmers and aggregators interviewed highlighted high transport costs because of not having their own motor vehicles as a major challenge. They also identified other challenges including:

- Transporting merchandise to big or reliable markets, such as Kasumbalesa border post, which are usually far from the seller's location comes with risks and added costs because the vehicles available are generally not road-worthy, overloaded and travel at night (to avoid police officers);
- Other transportation charges such as council levies result in increased transaction costs;
- The poor state of most feeder roads and some main roads and bridges also contribute to increased cost of transporting goods to warehouse houses and markets.

The generally high transportation costs in Zambia, disadvantage Zambians on the export market: products tend to be expensive and thus uncompetitive.

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<sup>17</sup> The Plant Quarantine and Phytosanitary Service (PQPS) is the National Plant Protection Organization (NPPO) of Zambia.

### **Logistics and trade**

The respondents cited the following logistical and trade challenges that affect commercialization of the oilseed subsector:

- i). Lack of proper warehouses for storage of grain within the locality of small-scale farmers and small aggregators to facilitate local marketing.
- ii). Selling through middlemen, such as, at Kasumbalesa because of language barriers, result in low profits or losses due to lack of transparency in transactions (e.g., the middlemen do not disclose the actual selling price and exchange rate).
- iii). Some of the oil crops are not bought by the Food Reserve Agency (FRA), e.g., groundnuts, forcing farmers with such crops, especially in remote parts of the country to sell to other buyers at lower prices.
- iv). Poor market linkages and information, especially for small-scale farmers and traders.
- v). Low prices offered to small-scale farmers, particularly cotton farmers, by private companies/ginneries. Most cotton farmers are price-takers. Seed cotton prices are determined and controlled at the world market resulting in increased price volatility.
- vi). Inadequate extension services provided to farmers on oil crops, affect productivity and production, especially among small-scale farmers.

#### 3.6.3. Access to Finance for producers and other value chain players

Most of the actors interviewed, especially Small and Medium Entrepreneurs (SMEs), small and medium-scale farmers cited inadequate finances as limiting production, including achieving optimum operational and output levels.; For instance, it was observed that most small-scale farmers are not able to increase their productivity and production because they have inadequate disposable income and capital to procure and/or invest in farm machinery and equipment, for operations such as land preparation, weeding and harvesting. Other value chain players like aggregators are unable to increase the volumes of grains they buy, store and supply to the market because of inadequate financial capital. Small and medium processors are similarly unable to meet buying targets for raw materials.

However, nearly all respondents interviewed, acknowledged that the financial challenges they were experiencing were not linked to lack of or inadequate liquidity in the financial markets; or their inability to mobilize enough finances. The difficult or unfavourable conditions for borrowing from formal financial institutions, such as stringent repayment conditions, high interest rates and requirement for asset-based collateral, were cited as the main reason for not accessing finances (i.e., loans and overdrafts).

Several respondents proposed the following measures for increasing access to finances, so as to facilitate full commercialization and enhanced performance of the oilseed subsector:

- i). Lowering of interest rates on loans and overdrafts and easing the requirements for collateral;
- ii). Provision of seasonal agricultural loans, which can be repaid after harvest;
- iii). Provision of agricultural loans in kind, such as seeds, agrochemicals, farm equipment and machinery, and oxen especially for small- and medium-scale farmers who are not under the Government's Farmer Input Support Programme (FISP);
- iv). Provide for loan repayment in kind.

Other financial challenges were cited by some oilseed value chain players, particularly Agro-dealers (Input suppliers), who have been participating in input supply to small-scale farmers under FISP. Government (Ministry of Agriculture) has delayed in paying some Agro-dealers for inputs supplied under FISP, as far back as three to four years. This has resulted in various challenges by the concerned agro-dealers, such as loss of or reduced capital, facing litigations for borrowed inputs (e.g. from seed companies and agro-chemical manufacturers), and seizure of personal and business properties.

Some small-scale cotton farmers, under out-grower schemes, also reported loan recovery challenges for inputs obtained from private cotton companies. Cotton input loans are repaid in kind but were reportedly recovered as a block, from one individual. That is, loans for all borrowers (out-grower scheme participants) in a block are recovered from one person, who first delivers the cotton to the out-grower company.

There are also a number of challenges from the supply side of finance. Due to delayed or default loan repayments, the Zambian banking sector has, in general, been experiencing high levels of non-performing agricultural loans. The percentage of non-performing agricultural loans has been higher for small-scale and emergent farmers than for large-scale/commercial farmers. The high rate of non-performing loans has discouraged banks from lending. The agriculture sector is perceived to have a high degree of uncertainty and risk.

Most small-scale farmers are lowly educated (illiterate), and thus have limited business management and financial skills. This has resulted in poor business management and understanding, and their inability to prepare bankable business plans and sometimes even fail to properly complete loan applications, to the expected standards of lending financial institutions. Consequently, most small-scale farmers' loan applications tend to be rejected.

On the other hand, financial institutions seem not to understand well the small-scale agricultural sector, especially the risks involved. The high transaction costs involved in dealing with and reaching the small-scale farmers who are sparsely located in remote rural areas, also discourages the lending financial institutions. Most commercial banks lending to the agricultural sector also do not have the appropriate infrastructure and skills in marketing financial services to the small- and medium-scale farmer category: and do not have adequate and appropriate human resources, i.e. technical expertise and numbers, to competently appraise loan applications and supervise or monitor the use of loans in concerned agricultural enterprises.

### 3.7. Value Chain Mapping

#### **Cotton value chain**

The cotton value chain is well structured compared to the other oil crop value chains. The entire value chain has over the past two decades received nearly USD1 billion in investment and accounts for up to 17% of the agricultural Gross Domestic Product [GDP]. The cotton value chain as it relates to edible oils comprises five distinct stages and several actors as shown in Figure 10.

There were 132,968 cotton farmers growing seed cotton in Zambia in 2018, through out-grower schemes facilitated by ginning companies. The Cotton Association of Zambia (CAZ) and Zambia National Farmers Union (ZNFU) are strategic institutions that currently coordinate farmers and



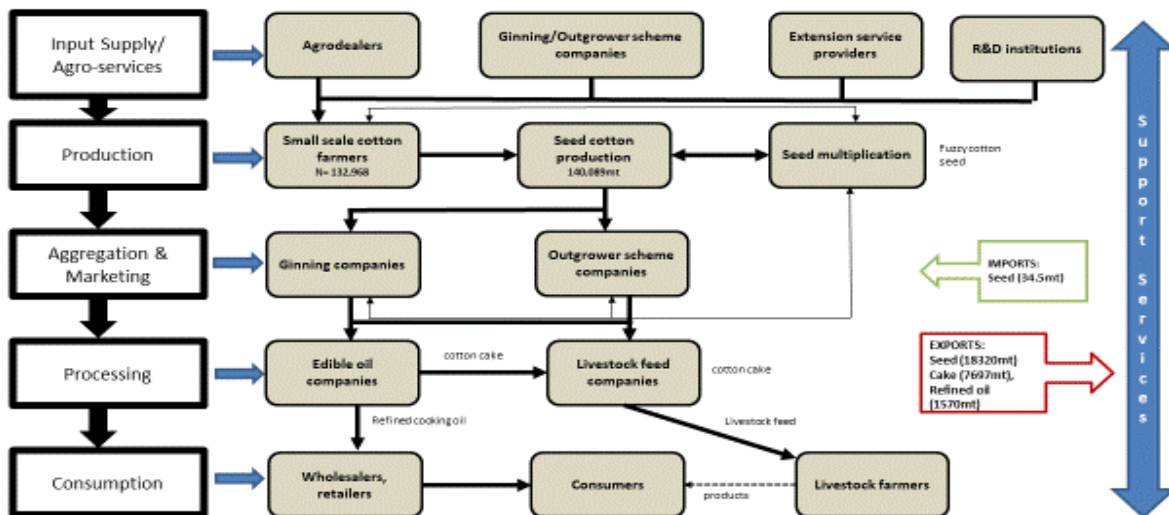
interface with relevant government institutions on issues of policy and legislation. Government, through the following institutions and departments under the Ministry of Agriculture, provides support to the cotton sector:

- SCCI – technical backstopping and seed certification services;
- Cotton Board of Zambia (CBZ)– implementation of seed cotton value chain processes and legislation; and
- Cotton Development Trust (CDT) – provision of research and development services, including training, extension, and supply of foundation seed to cotton ginners.

Cotton ginning companies provide seasonal loans and extension services, including commodity markets for cotton, while the Zambia Cotton Ginners Association (ZCGA) coordinates all ginners. Some ginners like Parrogate have integrated oil crushing facilities and are involved in edible oil crushing and crude refining for cotton. While companies like Mt. Meru Millers Zambia have independent edible oil processing components although cotton accounts for a very small proportion.

The major cotton by-products that go into consumption are refined cooking oil, directly, and indirectly, cake as livestock feed. The Country also exports notable quantities of cake to other countries.

*Figure 10: Cotton value chain Map*



### Groundnut value chain

The value chain map for the groundnut subsector is shown in Figure 11. The key players in the groundnut value chain are mostly small-scale farmers involved in production, supplies of seed mainly through FISP, and various seed companies (e.g., AFRISEED, ZAMSEED, Good Nature Seed and Kamano Seed Company). However, a significant proportion of groundnut seed is recycled by farmers. The Ministry of Agriculture plays an important role in terms of developing and releasing

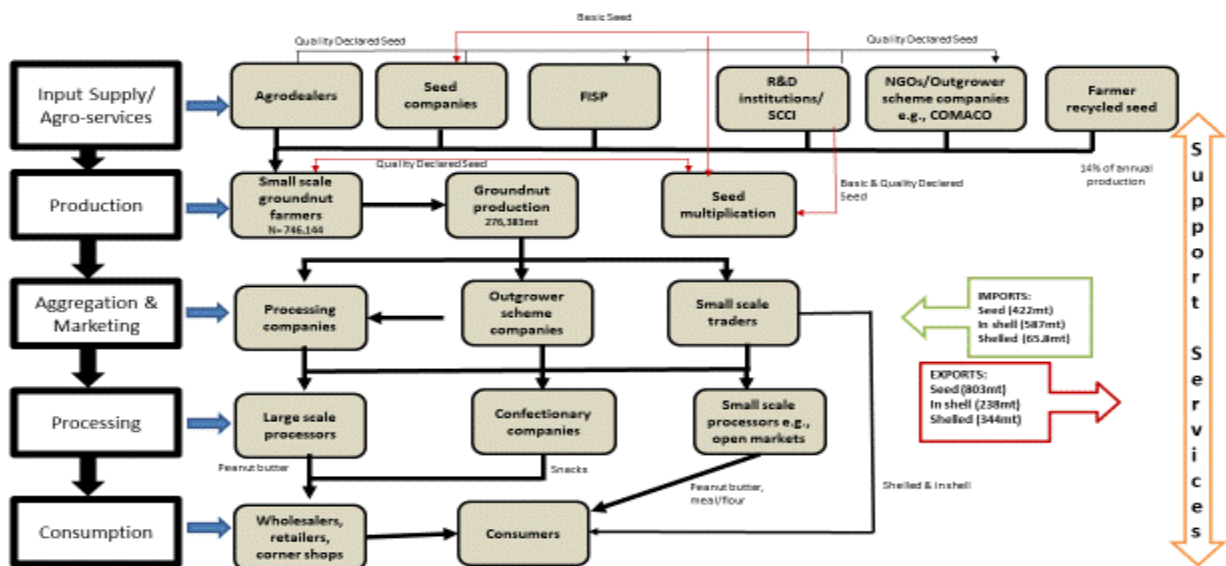
new varieties through ZARI, including facilitating seed multiplication, testing, training, and certification through SCCI. Several cooperatives and Non-Governmental Organizations (NGOs) are also involved in seed supply using out-grower schemes although these are localized to specific regions in the Country. Notably, COMACO runs the largest groundnut out-grower schemes, and also provides a market for small-scale farmers.

Groundnuts are mostly processed at small-scale level, into peanut butter or flour. However, there are also several medium-scale processors, such as Mpongwe Bulima Organic Cooperative Society, that process groundnuts into peanut butter for local retail and wholesale markets. COMACO is the largest processor of groundnuts into peanut butter, in Zambia, for both local and export markets. There is demand for peanut butter, however, the major challenges include aflatoxin contamination, low yields and inadequate certified seed supply. Groundnut processing into edible oils is not well developed in the Country. Peanut butter and roasted nuts constitute the major forms in which groundnuts are commercially processed for consumption. On the other hand, the most common form of processed groundnuts at small-scale (household) level is flour (pounded groundnuts)<sup>18</sup>.

Groundnuts are mostly exported as shelled or unshelled, informally to countries such as Congo DR, Tanzania, Malawi, Mozambique, and Angola. But Zambia imports a lot of unprocessed groundnuts from Malawi.

The prospects for developing the groundnut value chain into a foreign currency earner through exports look promising, although much is required to create stronger linkages among value chain players. By boosting the seed delivery system, farmers can access quality seed which in turn can increase production.

Figure 11: Groundnut value chain Map



<sup>18</sup> Groundnut flour is mostly consumed by mixing or adding it to other various foodstuffs, such as vegetables, porridge, dried meat, mushrooms, etc.

### **Soybean value chain**

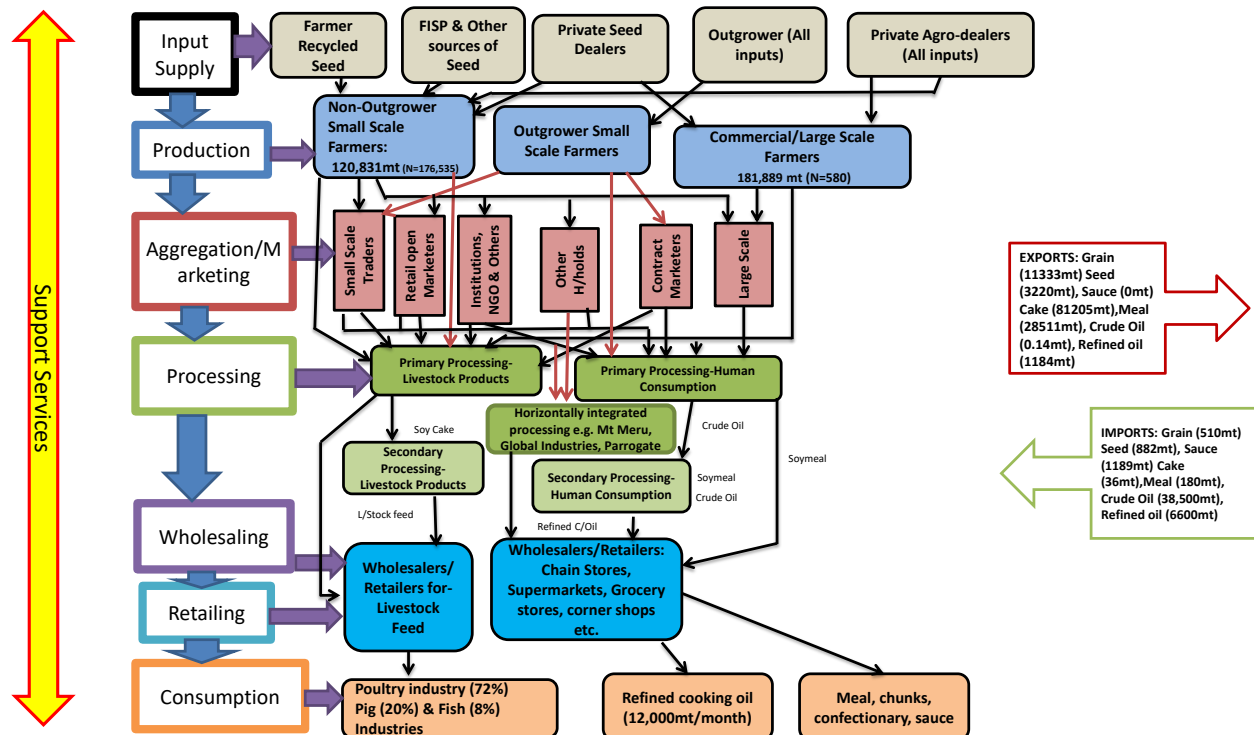
An overview of linkages involving value chain processes and actors in the soybean subsector, consisting of input suppliers, producers, aggregators, processors, and consumers, is shown in Figure 12. Among the prominent input suppliers are agro-dealers (i.e. seed, chemicals, fertilizers and inoculants), seed companies (e.g. SEEDCO, ZAMSEED, AFRISEED, Syngenta etc.), out-grower scheme providers, farmers (recycled seed), and government through FISP. The International Institute for Tropical Agriculture (IITA) and ZARI are involved in soybean breeding, although private seed companies also have breeding programmes.

Production of soybeans takes place at three levels involving small-scale farmers, commercial farmers, and out-grower schemes. There are several aggregators involved in the buying of soybean at farm-gate level, which is then taken to central bulking points and finally stored in warehouses before being transported to Lusaka and Copperbelt for processing. The notable aggregators of soybeans are Export Trading Group (ETG), Parrogate, Mount Meru Millers Zambia, AFGRI Corporation, Amatheon, Food Reserve Agency (FRA), Aliboo Limited, and Global Industries Limited. Small-scale farmers mostly sell to traders/middlemen from different parts of the Country, who later supply directly to processors or aggregators. The Study also found that there is a lot of small-scale informal trade involving soybean grain between Zambia and neighboring countries such as Malawi, Congo DR, and Mozambique. The major factor driving this trade is the attractive price of soybeans. Consequently, the marketing season for soybean lasts between four to six weeks in most parts of the Country. The marketing arrangements, by contrast, among commercial/large-scale farmers is well structured. Commercial farmers enter into production contracts with processors at the beginning of every agricultural season. For example, in Mkushi, commercial farmers have set up a company Agri Options Limited where they deliver their soybeans.

Soybean processing can be categorized into three, that is, edible oils, livestock feed, and other human foods. The three main processors of soybeans into edible oils are Mount Meru Millers Zambia (in Chibombo, Katuba area), Global Industries Ltd (in Ndola), and Parrogate (in Lusaka and Shibuyunji, Mwembeshi area). These three companies control about 75% of the market share. Other edible oil processors are Gourrock Zambia Ltd, Unified Chemicals Company and Emman Farming Enterprises (EFE) Limited. When the soybean is crushed, soybean cake a by-product is sold to livestock feed companies. The major livestock feed processors are NOVATEK, National Milling Corporation, Tiger Animal Feeds, Pembe Feeds, Farmfeed Ltd and Nutri Feeds, although there are several small- and medium-scale processing companies throughout the Country. The prominent companies processing soybeans into human food products such as soya chunks, mince and meal are 260 Brands Limited (Seba Foods Zambia Ltd), Quality Commodities (a subsidiary of ETG), Essential Commodities Limited, and COMACO.

Soybean accounts for nearly 90% of the 12,000 MT/Month edible oils consumed in Zambia. The main distribution channels are wholesalers, small and medium retailers, and big chain stores such as Shoprite, PicknPay, Game Stores, and Choppies. Another important avenue through which consumers access cooking oil is through bulk oil suppliers such as Zambeef. The findings from this Study also show that small-scale farmers have considerably increased local processing of soybeans into soymilk and soy coffee. The Poultry subsector consumes 72% of the soya cake for feed manufacturing followed by 20% for pigs, while 8% goes into fish feeds.

Figure 12: Soybean value chain Map



### Sunflower value chain

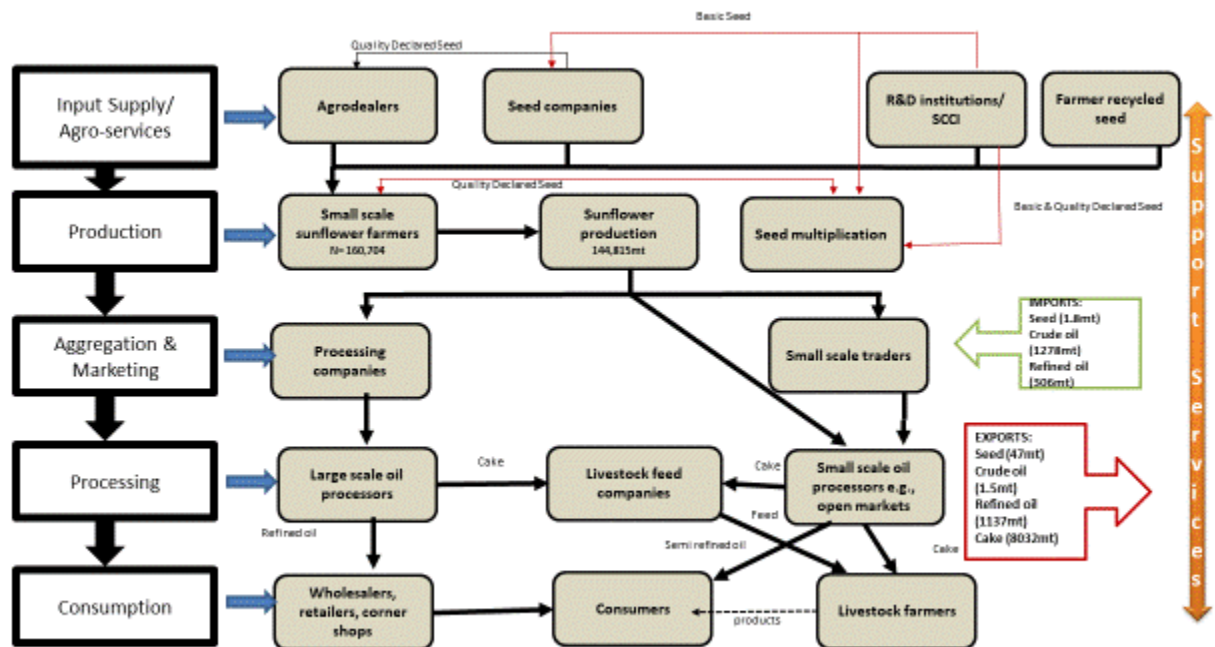
The sunflower value chain is not well developed when compared to the other oil crops. The value chain processes are mostly localised in districts where production occurs. A schematic representation of how the value chain is organised is shown in Figure 13. Although several input suppliers exist, the seed supply system is not well developed as farmers recycle most of the seed. ZARI and SCCI play a critical role in the development and release of certified sunflower seed (see Table 2 for sunflower varieties released in the last ten years).

The major buyers of sunflower are small-scale oil processors that produce crude oil and cake for animal feed. Sunflower mostly ends up as cake and crude oil. There are several of these sunflower processors in Kapiri Mposhi, Mkushi, Lundazi, Petauke and Chipata. A few of them are involved in out-grower schemes with farmers to increase supply of raw materials for their processing plants. They use mechanical extraction methods to extract oil from sunflower and produce cake for animal feed. Some of the processors do not charge for oil extraction but retain the cake as payment in kind, while others charge for oil extraction and still retain the cake, at no cost to them. The cake is then sold to livestock feed companies and/or exported to other countries. The processors earn more revenue from selling the cake. Thus, the retention of the cake by processors, after charging for oil extraction is/has been a complaint by the owners of the sunflower seed.

According to trade statistics for the year 2020, Zambia also imported 1,278 MT of crude and 306 MT of refined sunflower oils. The crude oil is refined and sold by wholesalers, retailers, and chain stores. Sunflower is largely consumed as crude oil among most rural households who grow the crop. Consumption is growing among rural households as crude sunflower oil is considered an alternative to expensive refined cooking oils.

Sunflower seed contains 35-42% oil, 16% crude protein, and 27% fibre. Nearly all the farmers interviewed said sunflower was a relatively easy crop to cultivate that requires less inputs. This creates an opportunity to further develop the sunflower value chain, which can contribute to edible oil and livestock subsectors.

Figure.13: Sunflower value chain Map



### 3.8. Impact of Climate Change on the functioning of the value chain

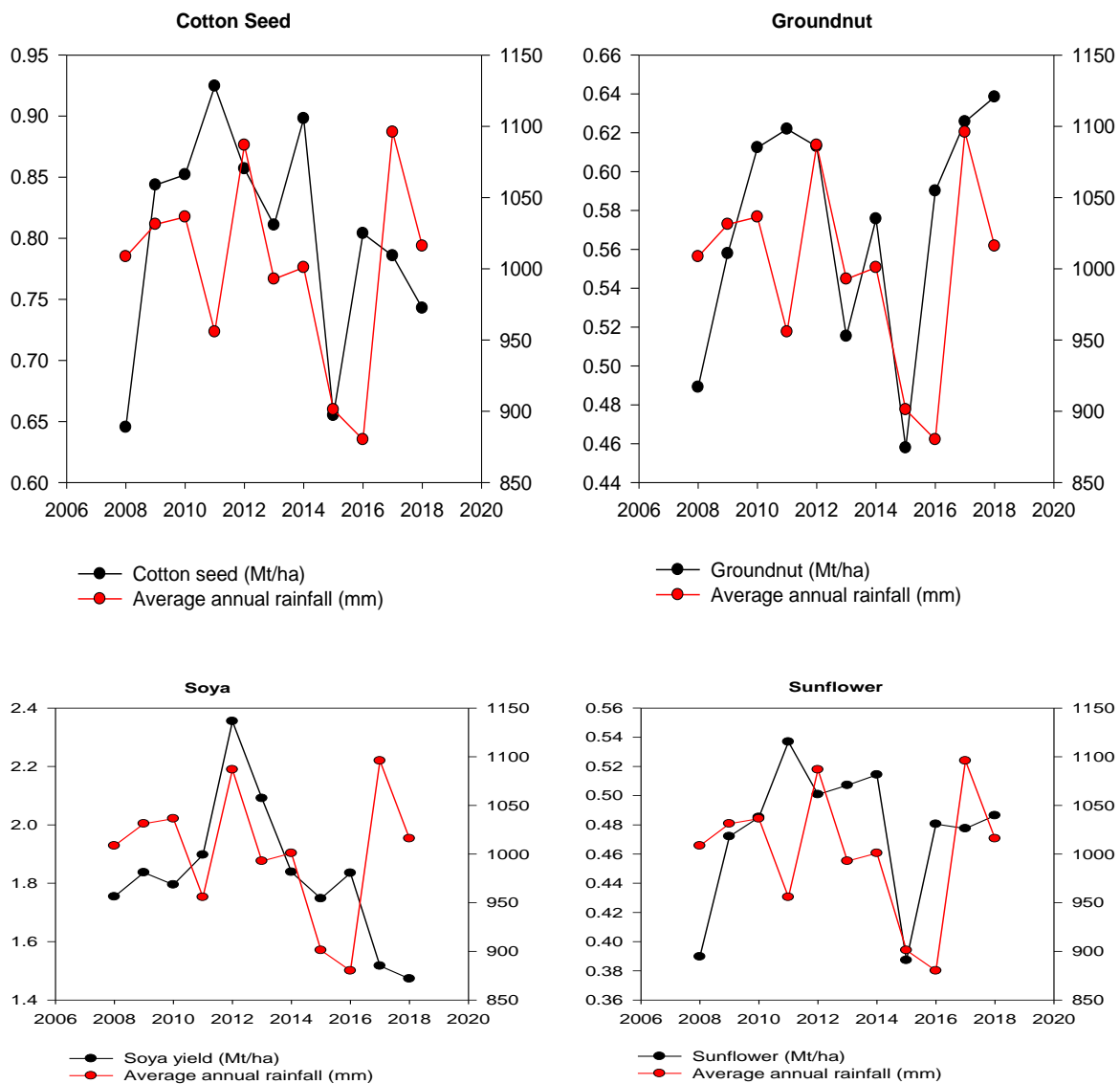
Climate change has been a phenomenon of much concern and debate the world over. Its impact on agriculture and food security has been one of the issues at the center of several socio-economic and environmental discussions. Like many other countries, globally, Zambia’s agricultural sector is also experiencing adverse climate variability. The projected impacts range from rises in temperature, floods, and droughts to other weather-associated adverse events. These impacts of climate change on Zambia’s agricultural sector put even more pressure on the existing challenges in both socio-economic and nutrition spheres.

To gain some insight on the impact of climate change on the oilseed subsector in Zambia, this Study also looked at the effects of climate change on the productivity and production of oil crops in the Country. Findings from the Study showed that the oilseed subsector is indeed affected by climate change, but those effects can be mitigated through adaptation. The most notable effect

that climate change has had on the subsector is reduced yields due to shifts in precipitation and proliferation of pests and diseases. Among the four oil crops (soybeans, cotton, sunflower, and groundnuts) that were studied, groundnuts showed more resilience to climate change while soybean was observed to be the least resilient.

An analysis of the effects and/or impact of climate change on the oil crops was undertaken by looking at the yields of the four oil crops in relation to rainfall, over a ten-year period in Zambia, from 2008 to 2018. Figure 14 shows the findings. As can be seen from Figure 14, the variations in the amount of rainfall received in each growing season seems to have had little or no effect on the yields of cotton and groundnuts. This is a general indication that groundnuts and cotton have some appreciable tolerance to low amounts of rainfall (drought), compared to the other two oil crops.

**Figure 14: Oil crop yields in relation to amount of rainfall received from 2008 to 2018, in Zambia**



*\*\*the average annual rainfall figures were computed by the Authors, from the rainfall data obtained from the Zambia Meteorological Dept., for rainfall amounts recorded in the different Weather Stations, within the Country, from 2008 to 2018.*

Figure 14 also shows that higher amounts of rainfall received tend to adversely affect (reduce) the yields of soybean. With regard to sunflower, the results do not show a clear effect of rainfall variations on the yield. From this analysis the observation is that among the four oil crops, groundnuts have the highest resilience to climate change effects, and rainfall in particular, while soybean is the least resilient.

## 4. Conclusion and Recommendations

The oilseed subsector has been growing with increasing numbers of players, especially small-scale farmers, leading to increased incomes and livelihoods. The subsector generally has good and ready market for oil crops and its processed products both within the Country and outside. Therefore, the subsector, has potential for attainment of full commercialization in Zambia, and is greatly contributing to the Country's agricultural diversification agenda. Overall, the subsector is increasingly contributing to the Country's socio-economic growth and development, including environmental sustainability. The major challenge currently inhibiting the attainment of increased or full commercialization of the subsector is the low productivity and production of the oil crops.

The current installed processing capacity of edible oils and other processed oil crop products in the Country, is enough to meet the local demand for these products and even produce surplus which can be exported. The key limitation in failing to meet the local demand, particularly for edible oils, is the inadequate supply of the raw materials or feedstock for processing. Thus, nearly all processors of the oil crops are currently operating below their installed full capacity.

Among the four (4) main locally grown oilseed crops in Zambia (i.e. soybeans, sunflower, groundnuts and cotton), soybeans appear to be the most attractive and showing increasing growth and potential. Although sunflower has the highest oil-content among the four crops, not so many farmers are growing the crop. There appears to be no reliable local market for groundnuts, but with ready and promising market outside the Country, especially in DRC. Additionally, farmers are facing challenges in sourcing good quality groundnut seeds; good or pure (certified) varieties of groundnut seeds are not readily and widely available. With the collapse of most local cotton processing factories (textiles), following the Country's privatization programme, there has been a decline in activities in the cotton value chain. The major current issue with cotton is the low price offered to farmers by cotton ginners: as the cotton price is said to be controlled by the global markets. Much of the cotton grown locally is bought mainly for lint and not for edible oil processing. Thus, a good number of small-scale cotton farmers are shifting to soybean production which is fetching a better price.

Local commercial production and processing of palm oil is just beginning with Zampalm Limited as the only notable local company. Thus, the Country has been importing a lot of crude palm oil to supplement the low supply of raw materials for refined edible oil production, in order to meet the local demand for edible oils.

While the oilseed subsector has a good or adequate number of players processing edible oils and other products like cake and livestock feed, there are however few local processors producing other food products for enhanced human nutrition, such as soybean chunks and high-protein supplements.



And apparently there is no local commercial processor currently producing soybean sausages, milk, burgers, mince, hot dogs, etc.<sup>19</sup>.

Although soybeans is gaining much prominence in production it is the least resilient to climate change effects, with groundnuts being the most resilient, among the four studied oil crops.

Besides the low supply of the required quantities of the oil crops (raw materials) needed for full commercial processing, the oilseed subsector also has a number of other challenges, which have been highlighted in this Report, under the different value chain functions.

In order to address and/or minimize the identified bottlenecks in the oilseed sub-sector the following recommendations are proposed.

#### 4.1. Recommendations

There are reportedly several underlying challenges constraining the attainment of increased or full commercialization of the oilseed sub-sector in Zambia. The following measures are, therefore, recommended in trying to resolve these problems.

##### **i). Production and Productivity**

- a. *In view of the abundant arable land and generally favourable climatic conditions, the focus should be on increasing productivity and production.* In this line several activities should be undertaken such as:
  - ✓ Promote and support appropriate mechanization, particularly at small-scale and medium-scale farming and processing (to alleviate human labour challenges and enhance efficiency);
  - ✓ Provide affordable agricultural inputs, i.e. lowering the cost of inputs (e.g., seeds, fertilizers, equipment and machinery, agro-chemicals etc.);
  - ✓ There is need for sustained investment (increased funding) in research and development, by both the Government and private sector, to develop and support early generation/foundation seed; and for enhanced development of indigenous crop varieties (not domesticating foreign varieties);
  - The Government and the private sector (processors and aggregators) should provide some incentives, to commercial farmers particularly growing oil crops, to make oil crop production more attractive to them. For example, currently oilseed crushers/processors are buying soybeans at a cheaper price from small-scale farmers, which has discouraged commercial farmers;
  - Seed suppliers should provide adequate certified seed for oil crops, especially for groundnuts and sunflower;
  - Identify suitable areas for production of oil crops, as guided by Zambia's Agro-ecological Regions' suitability; and not just growing them anywhere;
  - Encourage and support more out-grower schemes for oil crops production;
  - MoA should increase the input package under FISP to cater for larger hectareage (more than 1 Ha): and also, to extend input support to those who are not under

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<sup>19</sup> These food products are just imported from South Africa and mainly found in big supermarkets/chain stores in urban areas; and are generally highly priced; thus, not affordable by most rural and poor households.



FISP: commercial farmers should also be considered on individual cases (not all to be considered as not eligible based on the general hectareage for commercial farmers). The Ministry should provide all required crop seeds to farmers every year, particularly legumes, rather than already pre-determined seeds/crops.

- SCCI should encourage and promote community multiplication of certified seed for oil crops, to minimize or resolve the scarcity of certified seeds.

**ii). Agricultural Extension-delivery and Capacity-building**

b. *MoA should enhance extension service-delivery especially to small-scale farmers. Even the private sector (e.g. input suppliers and out-grower scheme providers) should equally provide extension services to supplement government efforts.*

- ✓ With emphasis on oil crops' production, storage, value-addition, marketing and consumption (for improved livelihoods and nutrition through crop diversification; and climate change mitigation);
- ✓ There is need for concentrated effort or collaboration between the private sector and the Ministry of Agriculture, in giving the same relevant information to farmers (to avoid or minimize distortion of information provided to farmers). Therefore, there is need for establishment of a common platform for discussing and sharing information to be provided to farmers;
- ✓ There is need for capacity-building, sensitization and/or training of farmers in various aspects, such as disadvantages of recycling seed, importance of value-addition, cooperatives' governance, business management and book-keeping, etc. (by government, private sector, and NGOs);
- ✓ MoA should provide adequate logistical support and facilities to its extension staff, e.g. transport to ease mobility;
- ✓ MoA should recruit additional extension officers in order to reduce the current farmer to officer ratio;
- Promotion and sensitization of farmers and other oilseed value chain players on the manufacturing and utilization of local products, especially plant-based foods, e.g. soymilk and soy coffee, for income and nutrition;
- Government extension services should also cover commercial farmers, on a case-by-case basis.

**iii). Foreign Trade Controls and Processes**

c. *Enhance import controls by sealing loopholes for illegal imports of various oil crop products in order to protect the local industries and markets.*

- There are currently various reported import irregularities and illegalities which should be stopped by government regulatory agencies: such irregularities include importation of edible oils under the pretext that it is in transit to neighbouring countries, e.g. DRC, which end up being sold on Zambian markets; and importation of refined edible oils declared as crude oil to avoid paying high tax, thus creating unfair competition.
- Carefully monitor and effect policy measures to minimize or ban imports of refined and crude edible oils, including other oil crop products, e.g. cake, in order to support or boost local processing industries.
- Enable Zambian Agro-dealers to directly import inputs, rather than them borrowing inputs from other bigger and foreign Suppliers.

d. *Carefully regulate exports to allow markets to operate freely.*

- ✓ Government should not ban exports, as bans restrict markets. Allowing exports will enable farmers to generate more income<sup>20</sup> and thus enhance their livelihoods.
    - Implement an open-boarder policy for soybean to boost local production and allow the market to equilibrate.
    - However, Government should ban export of raw/unprocessed grains and seeds, in order to boost local industries.
  - ✓ Allow export contracts for a certain percentage of the grain: to take advantage of the high foreign demand for Zambian grain, being non-GMOs.
  - e. *Create an open market information portal to check imports and exports, e.g. Zambia Geographical Information Systems, in order to facilitate easy access to foreign markets.*
    - ✓ Zambia Development Agency (ZDA) and other institutions should strongly support and facilitate foreign market linkages, e.g. through promoting and facilitating increased and frequent trade missions to other countries; rather than focusing on the local markets.
  - f. *There is need to harmonize trade rules and documentation processes for different countries, in order to minimize border delays.*
    - ✓ Minimize on the bureaucracy of import and export procedures for oil crop products.
- iv). Local Market Services and Support**
- g. *FRA and trustworthy private buyers should buy more oil crops as they do for maize.*
  - h. *There is need for government to regulate or monitor “briefcase buyers”.*
    - ✓ Enforce the weights regulations for “briefcase buyers” and monitor their market practices to ensure fairness, e.g. with regard to prices for oil crop commodities.
  - i. *Widen the market for seed to include emerging seed producers.*
  - j. *Government should ensure compliance to policy pronouncement for local chain stores to buy locally produced and manufactured commodities: so as to link small-scale farmers and local cooperatives to wider and bigger markets.*
  - k. *Assist in facilitating local markets through provision of warehouse and transport facilities and services, especially within the major oil crop growing areas.*
    - ✓ Government should consider establishing more storage facilities as buying points close to the farmers to reduce on transport costs; or to rent out to private sector.
    - ✓ Government should assist farmers in the transportation of inputs under FISP, as the case was previously;
    - ✓ Government should improve feeder roads and bridges to ease transportation and reduce on associated costs.
  - l. *Government should focus more on promoting and facilitating markets for cash crops (oil crops) for smallholder farmers rather than provision of predominantly maize inputs under FISP.*
  - m. *MoA should screen participating Agro-dealers under FISP and identify the good and bad ones; and work with the good ones, instead of black-listing all agro-dealers for poor/bad performance of some.*
    - ✓ Improve the selection of seed suppliers under FISP.

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<sup>20</sup> Farmers will get a better/attractive price incentive from export markets. Opening for exports will create a pull mechanism for more farmers to engage in soybean growing because the prices will be attractive.

**v). Local Processing Industry and Support**

- i. *Encourage and facilitate establishment of more local industries dealing with processing/crushing of oilseed products.*
  - ✓ Increase and support investment in edible oil processing in order to minimize or stop importation of edible oils in the near future.
  - Government through institutions, such as ZRA, Ministry of Finance and Zambia Association of Manufacturers, should offer more support and/or incentives to local small-scale manufacturers/processors (SMEs), as compared to foreign and big companies.
  - Provide financial support to start-up processors e.g. cooperatives, for acquisition of small-scale processing machinery and equipment; and to encourage investment in the dairy and other livestock sectors, so as to increase local capacity for uptake of excess oil crop production<sup>21</sup>.
  - Support and encourage rural processing industries. There is need for establishment of big processors in major oil crop growing districts, e.g. in Mkushi which is a major soybean growing district, to utilize the locally available raw materials.
    - Processors to support or promote out-grower schemes.
  - Provide subsidies and/or incentives for oilseed industries to lesson production costs, e.g. for electricity and affordable processing machinery and equipment.

**vi). Financial Support and Access**

- m. *Financial institutions should provide agricultural loans and/or overdrafts at lower interest rates and other favourable conditions.*
  - ✓ Provide input loans in kind, especially for acquisition of agricultural machinery and equipment and other farm implements; and monitor their utilization;
  - ✓ Allow for loan repayment after harvest;
- n. *Government (MoA) should provide farming equipment for hire and at lower price than that of the private sector.*
- o. *MoA should pay agro-dealers in time for agro-inputs supplied to farmers under FISP.*
- p. *There is need for establishment of specialized development banks or financial institutions for SMEs in agriculture and/or other different industries.*
- q. *Financial institutions, government and other agricultural stakeholders should come up with innovative approaches of stimulating demand, and encouraging lending to agriculture; as a way of resolving the complexity and challenges of financing the agricultural sector (particularly the smallholder farming sub-sector).* Therefore, there is need to establish a common platform for all value chain players to discuss and/or share ideas together, in order to address the challenges of limited access to finance involved in the agriculture sector. If the agricultural risk levels are lowered and/or fairly shared through such platforms and partnerships, financial lenders would be willing to bring down their interest rates, and borrowers would be willing to borrow.

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<sup>21</sup> If production increases to one (1) million metric tonnes to meet the current edible oils national crushing requirements (170,000Mt/year of oil) and demand, there would be a challenge of where to sell the resultant excess production of cake and/or meal, locally.

**vii). Climate Change Mitigation**

- q. *Intensify Climate-Smart Agriculture (CSA) to mitigate or minimize climate change effects:*
- ✓ Promote growing of more cover crops, e.g., sesban sesbania.
  - ✓ Empower institutions involved in the control and regulation of the use of natural resources, so as to conserve and protect the environment.
  - ✓ Breed more climate-resilient crop varieties.
  - ✓ Provide and promote appropriate irrigation facilities and technologies for increased utilization of and access to water.

**viii). Similar Policy and Technical Support for Oilseed sub-sector**

- r. *Government should come up with specific policies and support for the oilseed subsector as is the case for maize, in order to boost the oilseed subsector, e.g. input supply and market policies and support.*

**ix). Taxation**

- s. *The Ministry of Finance through ZRA should provide tax incentives for the oilseed subsector and ensure compliance to tax regulations by the industry players.*
- ✓ Reduce Value-Added Tax (VAT) on edible oils;
  - ✓ Tax regimes in the oilseed subsector should be regularly reviewed based on market dynamics unlike the current blanket measures;
  - ✓ Create a windfall tax regime as an incentive for players in the subsector;
  - Create a permanent task force to monitor production costs for edible oils for tax purposes;
  - Waiver import duties for agricultural inputs, such as fertilizer, instead of subsidizing farmers under FISP. This will enable input suppliers to offer affordable prices to farmers, on imported inputs;
  - Reduce or remove VAT/taxes on some farm equipment and machinery.

**x). Government Policies and Policy Consistency**

- t. *Government should provide a consistent agricultural policy environment, especially on market and trade policies. This will enable effective and efficient planning and smoothen the business environment and encourage more value-chain players to engage in the oilseed subsector.*
- ✓ Improve the macro-economic environment, e.g. stabilize the foreign exchange rate and make foreign currency easily available and affordable.
  - There is need to regulate refineries (processors) to curb cheating.

**Commodity-specific Recommendations**

Groundnuts

- Government should encourage small-scale farmers to grow groundnuts.
- Government should assist in providing and improving the market for groundnuts, by enabling FRA to also buy and provide empty grain bags for groundnuts.

### Sunflower

- Encourage more production of sunflower, by farmers, as it has higher oil-content than soybean, and has great potential; in order to meet the demand for edible oils.
  - Include sunflower on FISP.
  - Promote the market for sunflower in order to improve on the price (currently, the selling price is low).

### Soybeans

- There is need to focus on soybeans, in order to meet the demand. Commercial farmers are reducing area under soybean production because the prices have gone down. On the other hand, small-scale farmers are switching to soybeans from cotton because soybean is less labour-intensive, requires less inputs and yields higher (1 MT/Ha) than cotton (0.4 MT/Ha).
- Make the Country soybean self-reliant by investing in breeding better varieties (varieties with high oil-content).
- Include soybeans for all eligible farmers under FISP. Currently, soybean is given to some selected farmers.
- Government should facilitate the establishment of large-scale processing plants for other soybean food products, such as biscuits, chunks, milk, sausages, etc.
- Input suppliers should maintain a favourable and constant price for soybean seed.

### Cotton

- Enhance the whole local value chain, by reviving the cotton processing industries (e.g. spinners/textiles, crushers).
- Amend and strengthen the Cotton Act 2005 to bring in more cotton farmers and ensure availability of adequate seed in agro-dealer shops. Small-scale farmers are switching from cotton production<sup>22</sup> to soybeans.
- Strengthen the Biosafety Act No. 10 of 2007 by amending certain clauses, with regard to Genetically Modified Organisms (GMOs), i.e. to allow trials of GMOs to enhance knowledge/information before commercialization of seed and for future planning (in the event that GMOs are allowed in future).
- Government should not ban exports for cotton. The cotton subsector has only few players. On the other hand, consider restrictions on export of specifically cotton seed and cake, until the local supply is able to meet the local crushing capacity, so as to protect local industries.
- Encourage farmer-owned ginneries and/or local processors, such as the Mumbwa Ginneries.
- Ginners should offer good and competitive prices to farmers in order to stimulate production.
- MoA and the private sector should enhance extension services to farmers.
- CBZ and CAZ should encourage and promote more cotton stakeholder engagements, involving all value chain players.
- Government should assist in the regulation of loan recoveries by some private cotton companies, to protect the interest of small-scale farmers from unfair

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<sup>22</sup> Thus, Cotton production has in the last three years reduced from 100,000MT/year to approximately 25,000MT/year.

trading. For example, to stop block loan recovery through one individual who delivers cotton first to the input loan provider.

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## Annexes

### **A. TERMS OF REFERENCE FOR THE OIL SEEDS VALUE CHAIN AND CLIMATE IMPACT STUDY**

#### **1. Background**

At a special edible oils committee meeting held on 12<sup>th</sup> January, 2020 in the office of the Minister of Agriculture, the Ministry briefed the meeting that it was in receipt of several submissions on edible oils, both crude and packed refined. Several stakeholders from the industry had presented the following submissions among others, and were requesting the Ministry of Agriculture to intervene.

- *Toll Processing.*  
This was a new development in which traders who had no processing equipment were applying to import crude edible oil to toll-process with some processors. Follow-ups with CEDORA shows that these claims were usually not true.
- *Importation of Refined Edible Oil by Processors.*  
The Ministry had received reports that some processors were importing bulk refined edible oil disguised as crude oil. This was evident when ZRA, in mid-2019, impounded 60 tankers, some of which were carrying refined edible oil misclassified as crude.

- *Increase in local Prices of edible oil (Price fluctuations)*

It was observed that there was a general increase in local prices of edible oil. This was despite uninterrupted imports of crude oil which was considerably cheaper. Local prices of soya beans, however have continued to fluctuate with 2019 recording lower prices averaging US\$200 per Mt and 2018 recording prices as high as US\$500 per Mt: a development that had led to a general reduction in local production of soya beans by smallholder farmers who produce the bulk of the crop.

The Ministry was however cognizant of the fact that the edible oilseed industry, like all the other industries in the agricultural sector, had a lot of stakeholders whose interests in most cases were divergent. For this reason, the Ministry had adopted an industrial consensus approach in addressing these issues. This was done by encouraging stakeholders to meet and discuss the contentious issues in an effort to reach consensus and officially communicate the industrial position to the Ministry.

In the last communique, the industry, that includes the Crushers and Edible Oil Refiners Association (CEDORA) and the Zambia National Farmers Union (ZNFU), who are two key sector stakeholders, raised concerns regarding the happenings in the industry and their implications.

In the spirit of industrial consensus, the meeting noted the importance of having an independent detailed understanding of the oil seeds sector with regard to the national requirements, national production, installed processing capacity, consumption, imports and other market dynamics. This is also in recognition of the concept note which had been submitted to the Ministry of Agriculture (MoA) by the Agricultural Consultative Forum (ACF), on the formulation of a Soybean Development Strategy.

The ACF's proposal, in the Concept Note, to develop a Soybean Strategy was or is aimed at contributing to the Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) Project's objectives of facilitating the development of sustainable, productive, climate-smart agricultural systems to meet food security and economic development needs. The proposal is also in line with and supporting the implementation of Zambia's key current national policies and programmes, namely, the Vision 2030, Seventh National Development Plan (7NDP), Second National Agricultural Policy (SNAP), National Food and Nutrition Strategic Plan (2017-2021), and the on-going review of the National Agriculture Investment Plan (NAIP). The Proposal is looking at the climate resilience, food and nutrition security implications of soybeans, and the different supply chains that it feeds into. Soybeans is, therefore, one of such initial interventions or commodities with high potential to contribute to the Country's agricultural diversification agenda. Further, the development of the Soybean Strategy is also in line with the Government's plan of developing commodity-based action plans or strategies: such as the already existing Second National Rice Development Strategy and Cassava Development Strategy.

In view of the above considerations and the fact that ACF had been in the forefront of facilitating the formulation of both the above-mentioned Rice and Cassava Development Strategies; and has previous experience of facilitating the review of various agricultural policies and programmes, ACF was appointed to spearhead the undertaking of an oil seed industrial study. The study is to cover major oil crops in Zambia that include soybeans, sunflower, cotton, groundnuts and palm oil.

The Study is to be followed by a stakeholder consultation process and a validation meeting to discuss and harmonize all issues currently affecting the industry.



This Study, therefore, will seek to provide evidence on the important parameters of the oil seed sector in Zambia. The study will also form the basis for developing action plans for the commodities under review, as well as other key national, regional and international strategic development programmes and commitments, e.g. the Comprehensive Africa Agriculture Development Programme's (CAADP) second (NDCs), etc. through generation of relevant data as input into these programmes. NAIP, the African Union's Malabo Declaration commitments, the Nationally Determined Commitments

## **2. Overall Objective**

The 7<sup>th</sup> National Development Plan has identified a number of national priorities with industrialization, poverty reduction, and development of the agricultural sector through crop diversification and value addition as key areas of focus. Zambia currently is experiencing rising demand for edible oils. However, majority of the demand is being met through imports, mainly of palm oil, rather than through domestic production. This rise in imports is undermining prospects for growth in the domestic industry, which has experienced substantial investments in processing capacity as well as oilseed production. The overall objective of this study is, therefore, to understand the oil seed industry and identify policy levers to help enhance the value chains' contribution to the national agricultural diversification agenda, which is private-sector driven, for a sustainable and climate-resilient agriculture sector, which assures national and household food and nutrition security. The study will provide evidence on the important parameters such as national requirements, national production, installed capacity, consumption, imports and other market dynamics of the oil seed sector in Zambia.

## **3. Specific Objectives**

The specific objectives of this assignment are to generate information and data:

- 3.1. To identify and evaluate the challenges and opportunities, including other major issues, in the Zambian oil seed value chains and recommend ways of addressing the challenges while taking advantage of existing opportunities.
- 3.2. To arrive at an edible oils' industrial consensus position on the Country's production, supply and processing capacity, including national requirements for soya beans, groundnuts, sunflower, and cotton seed (edible oil crops).
- 3.3. To inform government and stakeholders on appropriate policy actions that will bring about desirable and sustainable outcomes in the edible oilseeds sector.
- 3.4. To explore the potential of soybean in contributing to climate-resilience and human and livestock nutrition, through the development of a national soybean development strategy.
- 3.5. To assess the climate sensitivities and overall risks of key target crops (soybeans, sunflower, cotton, groundnuts and palm oil) and their value chains.

## **4. Scope of Work or Specific Tasks**

The study will address the following issues and questions:

- a) Assess the sufficiency of Zambia's edible oils production capacity to meet current consumption levels;
- b) Determine how much of the total installed edible oils processing capacity is currently being utilized.
- c) Determine how much edible oil is imported into Zambia and the source of these imports.
- d) Establish if edible oils imports are compliant with Zambia's regulations as well as SADC and COMESA rules of origin.

- e) Ascertain the effect of imported edible oils on:
  - i. the domestic market for edible oils.
  - ii. oilseed production by smallholder and commercial farmers.
- f) Assess the effectiveness of the existing regulatory mechanisms for managing edible oil imports in Zambia.
- g) *Map the edible oil crops value chains* by creating a visual representation of the connections and interactions between businesses and other market players in the value chain (VC) for each of the identified oil commodities (Soybeans, Sunflower, Cotton, Groundnuts, and Palm oil):
  - i. Identify and categorize the market players including key businesses involved in core transactions and those providing various support functions (including government, Business Development services providers etc.)
  - ii. Identify and possibly quantify core transactions and end products.
- h) Establish the productivity, production, export and import price trends of these commodities (*Soybeans, Sunflower, Cotton, Groundnuts and Palm oil*) in the last 10 years.
- i) Assess or analyze the impact of climate change on the productivity and production of these crops and their resilience to climate change; including the viability, risks and challenges around oil seed products in a range of plausible future scenarios.
- j) Quantify the current national (annual/monthly) domestic consumption requirements i.e. human and industrial (livestock feed), compared with the processed volumes and the installed industrial processing capacity.
- k) What are the monthly stock requirements for the current operating processing capacity or demand?
- l) Analyze the prospects of penetrating export markets by identifying the opportunities and constraints.
- m) Examine the underlying factors (bottlenecks) inhibiting the value chains from achieving increased productivity and full commercialization.
- n) Ascertain to what extent these oil crops have contributed to improvements in livelihoods/incomes and nutrition, of the rural poor households, in view of the government's emphasis on enhancing nutrition and alleviating poverty, in rural areas.
  - i. Identify opportunities for increasing the value chain's contribution towards food and nutritional security, and market access in rural areas.
- o) *Analysis and Recommendations:* by taking a Value Chain Analysis (VCA) approach, identify leverage points for interventions or policy measures that would support the further development of the value chains (oil seed crops) in Zambia, especially with regard to climate change effects and resilience, and enhanced food and nutrition security for improved rural livelihoods.

## 5. Study Methodology

This analysis work should be implemented using a staged approach starting with value chain mapping and defining the components of the market system for the identified commodities and the market players.

The study should employ desk review and field data collection techniques to collect secondary literature and primary data, to facilitate analysis and generation of recommendations; and to address the existing and potential challenges of the edible oils industry, ultimately leading to the development of a national soybean development strategy.

**Literature Review:** to review various existing literature, such as other study reports, institutional reports, policy documents and strategies, manuals etc. related to the study. This will help to establish the existing body of knowledge regarding the value chains and to get a snapshot of the underpinning market systems and players. Additionally, the literature review will include available and accessible study reports, policy documents and strategies, manuals, etc. on the impacts of climate change on the target oil seed crops.

**5.1 Field Data Collection:** Undertake data collection in selected key and potential commodity areas (Provinces and Districts)<sup>23</sup>, including observations, to address and validate the given tasks, using appropriate data collection tools that should be developed.

**5.3 Synthesis of AFRICAP Integrated Assessment framework:** based on integrated modelling of crop productivity, land-use change (and associated emissions), and nutrition, the study will draw out the implications for oilseed production across the four (4) potential scenarios for 2050 – defined by high and low climate risk and high and low market connectivity and function.

## 6. Expected Deliverables

**6.1** The assignment deliverables will include:

- i) Presentation of the study findings at a stakeholder workshop, for additional input and validation.
- ii) Documentation of the validated research findings into a final report at least one week after stakeholder validation workshop.
- iii) A final study report of the value chain analysis, incorporating the input and/or comments, from the validation workshop.
- iv) A Policy Advisory Note to the Ministry of Agriculture and Ministry of Fisheries and Livestock.

**6.2** The final report of the value chain analysis work should clearly outline the following:

- i) **The visualization of the network of market players (Value chain Map)** underpinning the defined scope and the value creation process for the selected commodities and their by-products.
- ii) **The local demand and supply analysis:** Overview of the current situation regarding production, supply and demand in Zambia, including the understanding of the market players, and potential volumes.
- iii) **The international demand analysis:** Assessment of the international market trends and growth areas, major requirements of the actors of the value chain and their partnerships.
- iv) **A SWOT analysis** of each value chain to define the strengths, weaknesses, opportunities and threats. The analysis should identify the most important market players, and market networks. The analysis should also include clear and reliable information about the value chains in Zambia as it relates to the overall economy, the consumption patterns and links to food and nutrition security, climate resilience and agricultural diversification.

## 7. Implementation Timeframe

The assignment should be completed within a period of four to six calendar months, starting from June 2020 and to be concluded by end December 2020.<sup>24</sup>

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<sup>23</sup> The number and specific names of field data collection areas should be selected based on the criteria to be discussed and agreed upon by key stakeholders, before the commencement of field data collection: and these criteria should be included in the study report

<sup>24</sup> This is trying to take into account the current and possible Covid-19 restrictions, especially for field work.

- i) Development of appropriate primary data collection tools and desk Review should be completed by end of 31<sup>st</sup> July 2020.
- ii) Field data collection should be completed by 31<sup>st</sup> August 2020.
- iii) Data cleaning, analysis and draft report writing by 30<sup>th</sup> September 2020.
- iv) Draft report completion and preparation for presentation to stakeholders by 20<sup>th</sup> October 2020.
- v) The stakeholder workshop to validate the study findings should take place by 30<sup>th</sup> October 2020.
- vi) The final study report should be submitted (to the Government) by mid-December 2020.

## 8. The Study Team<sup>25</sup>

The Agricultural Consultative Forum (ACF) will lead the study and other study team members are proposed to come from the Ministry of Agriculture (MoA), Zambia Statistical Agency (ZSA), the Indaba Agricultural Policy Research Institute (IAPRI), the Zambia Revenue Authority (ZRA), the Ministry of Commerce, Trade and Industry (MCTI), and the Zambia Agriculture Research Institute (ZARI)<sup>26</sup>.

## 9. The Budget

A detailed budget has been prepared and will be funded by ACF.

## B. DATA COLLECTION TOOLS



Primary Data  
Collection Tools

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## C. SAMPLING METHODOLOGY FOR SMALL-SCALE FARMERS: OILSEED VALUE CHAIN AND CLIMATE IMPACT STUDY

**Non-random sampling** is used mainly for smaller-scale surveys where a specific focus is followed or a specific aim or target group is been surveyed. Non-random sampling can be more resource-efficient because the overall sample size can be **reduced significantly**.

We will specifically use a **non-random sampling (Purposive sampling)** technique, that is, respondents to be included in the sample will be selected according to **specific characteristics** that are previously determined (e.g. time spent growing a particular commodity). Purposive sampling will enable the team to gather information related to a specific group or subgroup among smallholder farmers in order to have a more detailed understanding of their role and key issues related to specific crop value chains.

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<sup>25</sup> The number of officers to constitute the Study Team will depend on the agreed upon key required expertise/skills and the budget.

<sup>26</sup> A Doctor of Philosophy (PhD) student at University of Leeds, sponsored by AFRICAP.

Therefore, in this Oilseed Value Chain and Climate Impact Study, the following criteria (specific characteristics) will be applied in the selection of smallholder farmers to be interviewed:

S/N	Smallholder key informants	Description
1	Location	Should be staying within 20km <sup>27</sup> radius of the central business district/economic activities in the district
2	Time in district	Should have stayed in the district for more than 5 years
3	Agricultural Knowledge or understanding	Should be knowledgeable enough about agricultural activities in the district or a specific crop value chain, including input acquisition, crop production, and marketing
4	Crops grown	Should be growing, preferably, more than one of the following crops for sale/home use: soybean, cotton, groundnuts, sunflower and palm oil
5	Farmer category 1: New entrants	Should have been growing any of the above crops for less than 2 years
6	Farmer category 2: Intermediate	Should have been growing any of the above crops for 2 - 5 years
7	Farmer category 3: Established	Should have been growing any of the above crops for more than 5 years

**Note:**

- i. 1 – 4 are general selection criteria that is applicable to all farmers.
- ii. From the farmers meeting these general (1-4) criteria, one farmer will randomly be selected to provide a sample for each of the three farmer categories (5-7). In each district, the target is to have key informant interviews with 3 smallholder farmers.
  - Where it may not be possible to cover three (3) smallholder farmers in each district, due to other challenges, it would be preferable to interview two (2) farmers, from categories 2 and 3 (i.e. one intermediate and one established).
- iii. Where possible, among the three or two farmers to be selected in each district, it would be preferable to have a gender mix of farmers, i.e. males and females, in order to capture a gender perspective.

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<sup>27</sup> Due to time and resource constraints, we would like to focus on respondents that are easily accessible with a motor vehicle. Moreover, we assume that farmers located within 20kms of the CBD would be quite familiar with value chain issues.

**D. LIST OF PEOPLE INTERVIEWED/CONTACTED**

S/N	Name	Gender	Institution	Position	District	Phone	Email
1	Mitchell Simawachi	M		Farmer	Mpongwe	0770 677541	
2	Stella Botai	F		Farmer	Mpongwe	0963 299442	
3	Charity Kantanga	F		Farmer	Mpongwe	0965 006820	
4	Cosmas Mawesa	M		Farmer	Mpongwe	0967 278471 / 0950 652027	
5	Cynthia Malawo	F	Ministry of Agriculture (MoA)	Crops Husbandry Officer	Mpongwe	0976 754226	<a href="mailto:malawocynthia@gmail.com">malawocynthia@gmail.com</a>
6	Timothy Ngoma	M	Mpongwe Bulima Organic Cooperative Society	Business Manager	Mpongwe	0977 898514	<a href="mailto:timothyngoma@yahoo.com">timothyngoma@yahoo.com</a>
7	Matthews Mbamba	M	Evergreen Enterprise	Director	Mpongwe	0968 748031	<a href="mailto:Mpongweevergreen02@gmail.com">Mpongweevergreen02@gmail.com</a>
8	Namposha Chitanika	F	BDM General Trading Farms	General Manager	Mpongwe	0962 606988	<a href="mailto:bdmfarmlimited@gmail.com">bdmfarmlimited@gmail.com</a>
9	Mwansa P. Bwalya	F	Luanshya Agro Suppliers	Operations Manager	Luanshya	0969 134242 / 0972 218890	<a href="mailto:mwansa@luanshyaagro.co.zm">mwansa@luanshyaagro.co.zm</a>
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12	Tenfold Tembo	M		Farmer	Luanshya	0977 816852 / 0964 841710	
13	Everlyn Chibonya	F		Farmer	Luanshya	0969 131389	
14	Gloria Chama	F		Farmer	Luanshya	0979 563953	

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26	Louis Chibale	M		Farmer	Mkushi	0978 550286	
27	Arnold Kalunga	M		Farmer	Mkushi	0976 901255	

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33	Obvious Mudonga	M		Farmer	Kapiri Mposhi	0975 885774 / 0966 300437	
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37	Bernadette Musonda	F	Bejack Farmers Friend & General Dealers	Partner	Kapiri Mposhi	0978 648091	
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63	Mary J Daka	F		Farmer	Petauke	0973808648	
64	Edith Katonda	F		Farmer	Chipata	0974037728	
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75	Philemon Lungu	M	Ministry of Agriculture	DACO	Chipata		
76	Stephen N’gona	M	ZAMSEED	Extension Officer	Petauke		
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83	Mr Alok	M	ETG Zambia	Director	Lusaka	0978740550	
84	E. Chirwa	F	Ministry of Agriculture	Camp Extension Officer	Lundazi	0973866466	
85	Triphonia Sibande	F		Farmer	Lundazi	0979524980	
86	Jessy Mvula	F		Farmer	Lundazi	0978514408	
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93	Ireen Raelly	F		Farmer	Chipata	0978544491	
94	Yona Mwanza	M	Nyimba Investment Ltd	Depot Manager	Petauke	0979392045	

**E. NUMBERS OF PEOPLE INTERVIEWED BY VALUE CHAIN CATEGORY**

S/N	Respondent Category	Number Interviewed
a	Aggregators	5
b	Farmers	23
c	Government and Parastatal Officers	10
d	Input Suppliers	13
e	Marketers	1
f	Processors	16 (-3)?
g	Researchers	3

**F. ZAMBIA'S 2020 MONTHLY IMPORT AND EXPORT QUANTITIES FOR MAJOR OILSEED CROPS AND PRODUCTS (in MT)**

	January	February	March	April	May	June	July	August	September	October	November	Total
<b>Imports</b>												
Cotton seeds	-	-	-	-	-	-	-	-	-	34.50	-	34.50
Cotton seed oil (excl. crude) & fractions	-	-	-	-	-	-	-	-	-	-	-	-
Cotton seed oil-cake & other solid residues	-	-	-	-	-	-	-	-	-	-	-	-
Groundnuts, seed	-	0.65	-	-	-	-	-	-	30.00	211.00	180.00	421.65
Groundnuts, in shell	-	-	-	-	-	-	42.52	13.29	-	10.00	-	65.81
Groundnuts, shelled	-	10.00	10.00	-	-	-	45.00	-	67.30	393.96	61.00	587.26
Crude palm oil	4,672.75	2,913.53	2,846.09	3,457.25	2,153.12	2,979.48	1,917.06	3,309.12	4,385.11	4,930.88	2,591.46	36,155.85
Palm stearin	125.35	61.00	65.98	66.66	64.00	27.00	-	65.00	161.14	-	89.04	725.17
Palm olein	987.52	1,330.57	1,000.84	1,340.29	1,922.74	1,637.31	839.03	1,465.67	617.10	1,249.84	1,134.16	13,525.07
Other palm oil	43.36	259.40	405.34	362.04	566.89	483.77	565.79	337.32	298.04	389.93	141.23	3,853.11
Soyabean, seed	0.36	-	-	-	-	-	-	280.00	520.90	14.40	66.30	881.96
Soyabean, excl. seed	-	-	-	-	-	-	120.00	270.00	120.00	0.02	-	510.02
Soyabean flour and meal	36.40	67.24	1.20	4.25	47.77	2.06	6.10	1.98	10.00	2.80	-	179.80
Crude soyabean oil	2,165.25	1,584.65	3,938.06	2,761.37	4,608.77	5,571.34	5,903.54	3,556.54	4,800.98	2,268.20	1,365.99	38,524.69
Soyabean oil (excl. crude) & fractions	0.12	6,500.00	1.45	-	38.50	-	34.06	-	-	-	-	6,574.13
Soya sauce	5.06	1,171.15	1.35	0.81	1.58	0.38	0.60	1.24	1.28	2.94	2.32	1,188.72
Soyabean oil-cake & other solid residues	-	-	6.60	29.10	-	-	-	-	-	-	-	35.70
Sunflower seeds	0.27	0.00	0.06	0.04	0.02	0.14	0.31	0.29	0.24	0.11	0.32	1.81
Crude oil sunflower & safflower	-	-	-	281.72	465.74	62.12	90.76	179.92	67.36	-	130.68	1,278.30
Sunflower & safflower oil (excl. crude) & fractions	62.76	30.85	1.32	31.50	1.27	34.01	32.29	61.23	0.04	50.57	0.26	306.10
Sunflower oil-cake & other solid residues	-	-	-	-	-	-	-	-	-	-	-	-
<b>Exports</b>												
Cotton seeds	1,749.28	-	315.00	105.00	-	1,735.00	4,885.41	2,374.82	3,322.26	2,881.18	951.88	18,319.83
Cotton seed oil (excl. crude) & fractions	-	-	-	48.90	196.95	231.71	374.42	380.53	-	-	337.63	1,570.14
Cotton seed oil-cake & other solid residues	1,915.97	1,374.84	368.58	331.94	613.24	154.00	-	470.08	804.91	793.98	869.82	7,697.36
Groundnuts, seed	151.42	20.00	-	-	240.60	119.86	150.12	120.42	-	0.10	-	802.52
Groundnuts, in shell	-	-	8.40	-	60.00	-	-	-	120.00	25.00	25.00	238.40
Groundnuts, shelled	-	35.78	10.00	0.01	17.59	-	13.17	-	5.51	7.80	253.61	343.47
Crude palm oil	-	135.48	-	-	-	-	-	-	-	-	118.82	254.30
Palm stearin	59.35	-	-	-	89.94	60.80	89.98	148.74	94.42	89.42	-	632.65
Palm olein	120.08	8.17	68.31	239.47	300.50	107.84	133.00	90.06	30.02	313.52	159.02	1,569.99
Other palm oil	-	2.39	-	-	-	-	-	-	-	-	-	2.39
Soyabean, seed	-	-	-	-	-	-	-	1,205.46	1,425.25	465.51	123.56	3,219.78
Soyabean, excl. seed	30.00	-	-	-	2,138.59	420.00	544.34	1,874.12	2,332.48	3,836.06	156.99	11,332.57
Soyabean flour and meal	3,025.00	3,454.00	3,241.00	107.00	90.00	-	3,877.20	3,755.00	4,887.22	2,643.56	3,430.98	28,510.96
Crude soyabean oil	-	-	-	0.14	-	-	-	-	-	-	-	0.14
Soyabean oil (excl. crude) & fractions	197.92	230.15	42.45	471.74	181.22	-	-	59.99	-	-	-	1,183.47
Soya sauce	-	-	-	-	-	-	-	-	-	-	-	-
Soyabean oil-cake & other solid residues	6,593.89	5,099.62	4,587.98	3,892.67	2,270.48	6,298.63	7,432.97	9,754.51	12,414.14	11,205.97	11,653.82	81,204.68
Sunflower seeds	-	-	-	-	17.00	-	-	30.00	-	-	-	47.00
Crude oil sunflower & safflower	-	-	-	-	-	0.40	1.00	0.06	-	-	-	1.46
Sunflower & safflower oil (excl. crude) & fractions	38.00	188.77	105.80	40.75	117.27	185.80	101.80	53.56	-	240.03	65.04	1,136.82
Sunflower oil-cake & other solid residues	182.00	110.00	170.12	368.42	548.90	1,343.00	1,005.00	447.01	806.64	2,106.00	944.83	8,031.92

