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THE POTENTIAL OF THE AGRO-PROCESSING INDUSTRY FOR INDUSTRIALIZATION IN ZAMBIA

WILLARD MAPULANGA

SUPERVISOR: **PROF. ANTHONY BLACK, PhD**

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Abstract

This study investigates how the development of the agro-food processing industry could support the structural transformation of the Zambian economy. This is set against a backdrop of improved food systems coupled with increased demand for processed foods domestically and regionally, as well as income growth, urbanization, and regional integration. Developing the agro-processing sector will involve the building of dynamic industrial capabilities along with product certification and standards, packaging, logistics, and access to formal markets. Using the value chain of soya beans, the study explains how the development of such a value chain could support structural transformation. Findings suggest that there are numerous opportunities, currently underexploited, for processing soya beans into diversified products. Insights from the study reveal further opportunities to accumulate productive capabilities, both downstream and upstream to stimulate value-addition and export-led growth. Harnessing these opportunities will require specific policy support for soya beans particularly aimed at growing smallholder entry, upgrading agricultural efficiency, engaging government and non-state actors to build capacity to improve processing technologies, food testing, packaging, meeting standards and certification schemes, as well as harmonisation of regional standards.

Key Words: Agro-processing, soya beans, value chain, capabilities, industrialization, Zambia

To my late mother, Elizabeth Kantu Mweene Makala-Mapulanga

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1. INTRODUCTION

1.1 Background and problem context

Historically, Zambia has been a copper-dependent economy and the export of raw materials has largely driven its participation in the global economy. The economy's weak manufacturing capabilities (Mudenda, 2009) and unsophisticated export portfolio reflect the huge benefits forgone because of the inability to transform raw materials into high value-added products (Fessehaie *et al.,* 2015). Despite the country's abundant agricultural potential to transform the economy structurally, this potential remains underutilized (Chapota *et al.,* 2018).

How to transform raw commodities into diversified high-value products to stimulate value-addition and competitiveness has been Zambia's long-standing problem (Fessehaie *et al.,* 2015; Kapya, 2016; World Bank, 2018). The concept of global value-chains (GVCs) provides an important methodological framework for conceptualizing the full range of value-creation activities that firms and economies could engage in to transform raw commodities into high-value products within geographically fragmented production systems (Gereffi & Fernandez, 2011). For GVCs to be beneficial, however, it is assumed that firms and economies can access the value chains, compete in those value chains, and capture the gains for local economic development (Kaplinsky & Morris, 2000). In other words, firms need to have dynamic capabilities to participate in global trade in the first place and progress to higher levels of value addition and capture greater gains from trade within these value chains.

Studies[1] on Zambia's economic development point out the slow pace of industrialization since independence. The economy remains in an enclave structure, driven mainly by revenue from the export of primary commodities. In fact, even amidst deepening economic integration and liberalization, Zambia's participation in domestic and international trade is limited to lower-level production activities (Fessehaie *et al.,* 2015; Chitonge, 2016). This study will contribute to the discourse on what opportunities Zambia's economy could leverage to create possibilities for

[1] Refer to Mudenda (2009); Chitonge (2016); Fessehaie et al. (2015) and UNDP (2016)

the accumulation of productive capabilities in the agro-industry, and how this could be done. It will demonstrate this using the soya bean value-chain, given the country's production and processing potential for this crop, which is currently underexploited. Soya beans were chosen because of the wider opportunities they present, of producing high-value add products such as oilcake, edible oil, and soymilk, among others, to harness agro-processing activities.

The literature repeatedly posits (Hausmann *et al*. 2006; Hidalgo, 2009; Page, 2011; Rodrik *et al.,* 2016; Dube *et al.,* 2018) that developing diversified and dynamic industrial capabilities is crucial for structural transformation. According to the UNECA (2015:56) report, structural transformation refers to the "reallocation of resources—especially through new investment—from lower- to higher-productivity activities, shifting typically from agriculture to industry and modern services and within each of these sectors from lower- to higher-productivity niches. It is closely linked to—and usually involves—industrialization and is associated with shifting people and resources into transforming and processing raw materials." Developed countries are rich today because they have achieved structural transformation. They have been able to diversify away from sectors with low productivity into manufacturing and other modern activities (Rodrik, 2011). However, this has been challenging for a resource-dependent and landlocked country like Zambia. Therefore, this study identifies the agro-processing industry as a sector that can potentially act as a key driver for accelerating the industrialization process.

As a manufacturing sub-sector, the agro-processing sector involves the transformation and production of primary products into diversified and high-value processed products for both local and export markets (FAO, 1997; Wilkinson & Rocha, 2008). Agro-led structural transformation is essential because it offers broader possibilities for enhancing manufacturing and industrial capabilities in the economy (*ZDA,* 2014; Sutton & Kellow, 2011; Dube *et al.,* 2018). Further, the agro-processing industry is associated with strong backward and forward linkages (Wilkinson & Rocha, 2008; Prete *et al*,. 2016; Greenville, 2017; Dube *et al.,* 2018; World Bank, 2018).

In Zambia, the agro-processing sector dominates manufacturing activities, accounting for approximately 63% of total manufacturing output (UNDP, 2016: 32). Therefore, this study focuses on food processing because it forms a significant component of the agro-processing industry. The growing interest in the food sub-sector is driven by the expanding demand for processed food arising from growing incomes and urbanization. Increased regional economic integration has further encouraged local and foreign firms to invest in food-processing activities to meet the increased demand for processed food and other manufactured products. Linked to this trend is the proliferation of South African-based supermarket supply chains, such as Pick n Pay, Shoprite and Game Stores, which provide key routes to markets for both local and foreign suppliers (Dakora, 2012; das Nair & Chisoro-Dube, 2016; ; Paremoer, 2018). These developments offer rapid growth prospects, provided challenges related to upgrading, access to quality inputs, design, packaging, product certification and standards, and distribution are dealt with. Despite the presence of supermarkets in Zambia, domestic processing firms possess limited capabilities to engage and effectively participate in the agro-food value-chains (Ziba & Phiri, 2017).

On the other hand, research evidence generated by Fessehaie *et al.* (2015) suggests that while Zambia has substantial potential for agricultural production, there seem to be considerable deficits of processed foods owing to high production costs, post-harvest losses, lack of access to finance, and infrastructure bottlenecks, among other factors. Imports tend to make up for the food deficits in the absence of vibrant agro-processors ability to manufacture diversified food products for the growing consumer base (Samboko *et al.,* 2018).

In this regard, industrial development channeled through agro-food processing is a stepping-stone to harnessing manufacturing capabilities and agro-processing must therefore be addressed as an industrialization question. There are numerous opportunities for initiating and expanding agro-food value-chains in Zambia. These include, among others, beverages, edible oil

production, sugar and confectionery processing, meat processing, fish canning, cashew nut processing, and dairy processing.[2]

However, developing agro-food processing requires a supportive industrial policy environment and the development of the necessary industrial capabilities, together with ancillary services such as packaging, product certification and standards, and logistics. It is against this background that this study seeks to understand how the development of the agro-food processing industry could lead to upgrading opportunities and the development of capabilities that would facilitate structural transformation, using the soya-bean value chain as a case study. The study argues that the agro-food industry could act as an engine for industrial development, provided that local firms' capabilities are maintained and developed in a manner that increases their participation in local, regional, and global value-chains.

1.2 Research questions and study objectives

The study's overall aim is to understand how the development of the agro-food processing sector could potentially promote the structural transformation of the Zambian economy. The study will explore the following three broad questions:

- How has value-addition and capabilities development evolved in the food processing industry and based on trade data, what food-processing sector offer upgrading opportunities to support industrialization in Zambia? The study identifies sugars and sugar confectionery, cereal, and soya bean as potential agro-processing value chains to explore for industrialization. The study further uses soya bean value chain to demonstrate the industrialization potential because of its important linkages to a wide variety of products with a high added value, such as soymilk, edible oil, and soya cake, because of innovation by agro-processors in recent years.

[2] Zambia's agro-ecological landscape is subdivided into three regions. Region 1 covers the western and southern parts of the country and agriculture is mainly concentrated on maize, sugarcane, millet, sorghum, and livestock farming. Region 2 covers the central part of Zambia, stretching from the east to the west, and is famous for sorghum, maize, groundnuts, soybeans, sunflowers, irrigated wheat, cassava, Bambara nuts (voandzeia) and horticultural crops. Region 3 covers the northern part of the country and people traditionally grow crops such as maize, sunflowers, tea, tobacco, irrigated wheat, coffee, and soybeans.

- What are the opportunities and constraints encountered by agro-food processing firms in the soya bean value chain in Zambia?
- What roles can the government and foreign firms play in helping local firms in the soya bean sub-sector develop dynamic capabilities to increase their participation in agro-food value chains?

1.3 Significance and rationale of the study

The agro-processing industry refers to post-harvest activities that involve transforming, preserving, and preparing agricultural raw materials for either intermediate or final consumption (FAO, 1997). In Least Developed Countries (LDCs), the agro-processing industry occupies a dominant manufacturing activity position, representing about 50% of total manufacturing output (UNIDO, 2013:2). Zambia's agro-processing industry constitutes approximately 63% of total manufacturing activity in the economy (UNDP, 2016: 32). Agro-processing plays a key role in supporting Zambia's manufacturing activities.

In recent decades, Zambia has experienced high population growth, leading to rapid urbanization, which in turn has boosted both the intermediary role of agro-food production and final consumption (Paremoer, 2017). According to the CSO (2018), "Non-Traditional Exports", especially food and beverages, have been on an increasing trajectory following the rising demand associated with growing incomes and urbanization, as well as increased demand for food products in the region. Regionally, this trend is also linked to the rapid spread in the establishment of retail chains, including regional supermarkets such as Choppies, Shoprite, Woolworth, and Pick n Pay, which has so far captured the gains from regional trade. Domestically, the Zambian government, seeing these trends has, through its industrial policy, made some effort to promote agro-processing and the manufacturing sector, and enhance linkage development with the agriculture sector. For example, the government is working towards attracting more agro-related investments both within and outside Multi-Facility Economic Zones (MFEZs), establishing commercial farm blocks, and promoting agribusiness through multi-stakeholder platforms. These government efforts present opportunities for

enhancing economic upgrading that will stimulate the economy's competitiveness in regional and global markets.

Whether one considers the domestic or the export markets, the agro-processing food industry could play a fundamental role in generating jobs, income, and value-addition opportunities.

1.4 Methodology, Data Sources, and Other Considerations

Methodology: Value Chain Selection

The study used secondary data sources, which were supplemented by interviews of selected stakeholders in Lusaka, Zambia, in the agro-food processing industry. The interviews were limited to the soya-bean value chain because Zambia has production and processing capabilities for this crop, and unmet food demands, both in the domestic and regional markets.

This study's findings are primarily based on the synthesis of secondary sources and interviews with agro-firms, interactions with agro-industry experts, private sector business associations, government agencies and ministries, and the researcher's direct observations in the field.

A total of 19 participants were selected for interviews using purposive sampling technique. Ethics clearance was obtained from the University of Cape Town Ethics Research Committee of the Faculty of Commerce. Participants were presented with consent forms before the interview and were briefed on the purpose of the study and their right to privacy.

Data Sources

The study uses a mixture of secondary sources and primary information obtained from field interviews. Quantitative data sources were obtained from publicly accessible sites, including the World Bank (WB), the United Nations Conference on Trade and Development (UNCTAD), the UN ComTrade database, the Central Statistics Office (CSO) Zambia, and other relevant organizations, which are key to evaluating trade performance and investment trends. The information obtained from these sources, including annual reports, publications and journal

articles played a vital role in mapping out the food value chains with potential for upgrading and capabilities development.

To complement secondary data sources, in-depth face-to-face interviews, with semi-structured questionnaires, were used to gather information about key processes and those involved in the value chain, the governance and competitiveness of the value chain, and opportunities and challenges in the food industry. Interviews were conducted from 29th July to 21st September 2019.

Organization of the Study

The rest of the paper will be organised as follows: section two of the paper will present the global value chain (GVC) conceptual framework, whose scope is relevant in understanding the value-creation process and capabilities development in the agro-processing sector of the study. Section three will present an overview of Zambia's industrialization experience and the policy environment related to agro-processing. Section four will outline patterns of growth and development of the agro-processing industry. Section five will explore the potential for upgrading and capabilities development in agro-processing using soya beans as a case study. Section six will investigate the opportunities and challenges encountered by agro-processors in Zambia. Before drawing conclusions, with possible policy interventions, section seven will look at the roles of government and multinational institutions in supporting the agro-processing industry.

2. THE CONCEPTUAL FRAMEWORK OF THE STUDY

This section describes the conceptual framework used in the study. The research adopts the global value-chain (GVC) framework (Gereffi *et al.,* 2001; Kaplinsky & Morris, 2000; Chisoro-Dube *et al*., 2018; Fessehaie & Morris, 2018; WTO, 2018), whose scope is relevant in understanding the value-creation process and capabilities development in the agro-processing sector (Jahari, Dube, & Paremoer, 2017; Nkhonjera & das Nair, 2018). Owing to the complexities of engaging in GVCs, the study also examines Zambia's opportunity to participate in local and regional agro-value chains as an entry point to the global economy. Local and regional agro-value chains have become increasingly important for developing countries because there are fewer barriers to entry (Ncube *et al*., 2017).

2.1 Literature: The Global Value Conceptual Framework

2.1.1 What are Global Value Chains?

Global Value Chains (GVCs) have changed the methods of production and specialization across the globe. Simply put, GVCs define the "full range of activities that firms and workers do to bring a product from its conception to its end use and beyond" (Stark, 2011:4). Using concepts such as "end markets, governance, rent, and upgrading," GVCs highlight the nature of new patterns of how employment, production, and international trade shape the prospects for economic development and competitiveness. The GVCs framework documents the international expansion and geographical fragmentation of production systems and focuses primarily on matters of industry re-organization, coordination, governance, and power in the value chain (Gereffi & Lee, 2012).

2.1.2 Conceptualizing Upgrading and Capabilities Development in Global Agro-Value Chains

The GVC framework has become a widely used methodological tool to analyse the opportunities for and challenges to industrial upgrading and capabilities development for participants in various value chains. This is because the GVC framework provides far greater insights to those trying to map out value creation patterns and explore strategic points of entry and linkage development for geographically dispersed production networks (Gereffi & Fernandez-Stark, 2011).

Flows of trade, investment, and knowledge within GVCs are significant for rapid learning, innovation, and industrial upgrading (Gereffi, 2015). Participation in GVCs is thus fundamentally crucial for structural transformation, and the ability to insert oneself into GVCs is a stepping-stone to economic development. But to reap the benefits of participating in GVCs, firms must first be able to access the value chains, compete in those value chains and capture the gains for local development. Instead, many sub-Saharan developing countries, including Zambia, have found that GVCs offer limited benefits (Gibbon & Ponte, 2005). This is because developing countries have historically inserted themselves at the lower end of the value chains, where there are limited opportunities for industrial upgrading into more dynamic technology- and skill-based industries (Kaplinsky & Morris, 2016). Nkhonjera and das Nair (2018) further explain that developing and maintaining agro-industry capabilities is a major constraint for southern African economies.

At the core of the GVC framework, apart from the descriptive aspect of the analytical concepts – the input-output structure and territoriality – the twin analytical dimensions of "governance" and "upgrading" in the GVC literature have received most attention, mainly because they exemplify the key concepts of chain coordination, entry barriers, and upgrading opportunities.

The term, governance, draws attention to the authority and power relationships that determine the allocation and flow of resources within a value chain (Gereffi, 1994; Gereffi & Lee, 2012; Dallas *et al.,* 2017). The role played by lead firms in coordinating production networks and shaping the distribution of rent is crucial to understanding the governance structures (Gereffi & Lee, 2012). Within GVCs, lead firms have the power to influence production activities through the enforcement of standards for product and process protocols, and these standards must be met by those wishing to operate within the value chains. In other words, lead firms have the power to determine what to produce, how to produce, and how much to produce (Gereffi & Fernandez-Stark, 2011).

Insights on governance can be extended to analyze industrial organization tenets to investigate market and buyer power in the soya bean value chain. As illustrated in section 5.4 below, edible oil, and soya oilcake, produced as soya beans by-products, form a large market for the soya bean value chain. However, Zambia's industrial policy does not provide specific support for soya beans and thus, the value chain is very concentrated and often predisposed to abuse and cartelization.[3] Specifically, in the edible oil industry, three lead firms hold 74% of the total market share. In the stock feed industry, 70% of the market is controlled by three major players. However, as aggregators, who complement value-chain activities by purchasing the product from farmers, also have to resell to the agro-processors, there is a possibility for the agro-processors to influence pricing mechanisms by virtue of their market and buying power (CUTS, 2016).

Unpacking the analytical dimensions of market and buyer power and how these are imposed on suppliers in the value chains is central to informing policy strategies that will remove constraints, and thereby facilitate structural transformation through the enhancement of upgrading opportunities and the development of capabilities for those participating in the soya bean value chain. While there are many forms of governance, it is important to note that governance follows a "top-down" mechanism and upgrading takes the form of a "bottom-up" approach. This is useful because it helps firms explore ways to insert themselves in the GVCs or improve their performance (Gereffi & Lee, 2014).

Nevertheless, upgrading within the GVCs does not happen automatically; only the firms that have mastered new capabilities have the chance to upgrade and begin to move up the value chain. Upgrading allows firms to shift from low-value to high-value activities through participation in GVCs (Staritz & Morris, 2013; Kaplinsky & Morris, 2016). As used here, the GVC framework shows how subordinate actors in the GVC can find indirect access to end markets,

[3] There is limited participation by smallholder farmers, and currently commercial farmers, whose productive capabilities are well developed, tend to overshadow small-scale farmers in the market. However, there is evidence (Imakando, 2017; Paremoer, 2018; Markotwitz, 2018) suggesting an increase in participation by smallholder farmers arising from the presence of NGOs such as Technoserve who are developing the capacity of small-scale farmers to grow soya beans.

knowledge, and technology at cheaper costs than they would otherwise encounter (Staritz & Morris, 2013).

In the GVC literature (Humphrey & Schmitz, 2002; Staritz & Morris, 2013; Kaplinsky & Morris, 2016) there are five types of upgrading: product, process, functional, and end markets upgrading.

- ***Product upgrading***: improving the technology or production systems to gain efficiency and flexibility;
- ***Process upgrading***: shifting to more sophisticated and complex products;
- ***Functional upgrading***: increasing the range of functions or changing the mix of activities to higher-value tasks;
- ***Chain upgrading:*** establishing backward manufacturing linkages within the supply chain; and
- ***End markets upgrading***: diversifying to new buyers or new geographic or product markets.

The ability or inability for firms to upgrade reflects various interesting industrial policy considerations. For many developing economies, and Zambia in particular, the major challenge, however, is identifying the right conditions for insertion into and climbing up the value chains from the level of basic activities, such as agro-processing and assembly using cheap and low-skilled labour, to advanced techniques such as designing, marketing, and research and development (Kaplinsky and Morris, 2016).

2.1.3 Linking the GVC framework to Agro-Value Chains and Capabilities Development

Although upgrading is central to industrial development, it is a concept that is not yet fully understood by the agro-industrial sector in sub-Saharan Africa (Riisgard & Hammer, 2011; Page, 2012). In fact, most firms find it difficult to differentiate between process and product upgrading. Nevertheless, broadly understood, upgrading takes the form of deepening dynamic capabilities essential to explore new and better opportunities in the value chain the firm is currently engaged in (Morrison *et al.,* 2008; Ponte & Ewert, 2009). Morrison *et al.* (2008),

however, contend that it is not just about aiming for functional upgrading and shifting to more complex activities within the value chain. Instead, it is about deepening the unique capabilities needed to explore new opportunities at the same stage in the value chains in which the firm is currently involved. When moving up to higher positions in the value chains, including marketing, packaging, product certification, and branding, firms must deepen their skills development and advanced technological capabilities.

Therefore, as argued in the study, facilitating structural transformation through agro-industry requires maintaining and building capabilities for agro-processors in a manner that increases their participation in food value chains. Realizing the gains and opportunities of participating in agro-value chains, such as soya beans, requires all stakeholders' collaborative, and coordinated efforts along the entire value chain.

Studies such as Gereffi *et al.* (2009), Lee *et al.* (2012), Cramer and Sender (2015), Ncube *et al.* (2017), and Krishnan (2018) on agro-food value chains discuss how lead firms facilitate or block upgrading opportunities for other firms, especially those in developing countries. Upgrading opportunities for and constraints to small agro-food processing firms have been studied widely because of increasing demands for food safety and standards enforced by northern markets (Lee *et al.,* 2012; Ncube *et al.,* 2017; das Nair *et al*., 2017; Ziba and Phiri, 2017). Product and process standards imposed by northern retailers on agro-food processing firms in the global south imply that they must acquire an array of dynamic capabilities to maintain their position and their relationship with lead firms in the food value chains. On the other hand, higher production efficiency means that agro-food suppliers need to reach scale economies and acquire greater financial flows to execute operational overheads. This, however, increases barriers to entry for poorly resourced agro-processing suppliers, especially those involved in the export sector (Krishnan, 2018).

While lead firms continue to be sensitive to the demands of cutting costs, increasing standards and the production speed, they, together with government agencies and multilateral donor organizations, can actively give support to agro-processors in terms of skills transfer, knowledge, and technology. Strategies such as Supplier Development Programmes (SDPs) run by state and non-state actors have implications for building local agro-food processing firms'

capabilities. Maintaining and building capabilities will require effort, especially considering the Zambia's political economy and the need for an effective industrial policy. Within the region, there are opportunities for Zambia to participate in agro-value chains, as entry barriers remain low compared to those of advanced markets, which are extremely sensitive to standards.

3. MOVING TOWARDS AGRO-LED INDUSTRIALIZATION

3.1 Overview of Zambia's Industrialization Experience

At independence in 1964, Zambia inherited an economy that was heavily dependent on mining. The mining industry contributed 55% of the country's GDP and 90% of government revenue through foreign exchange (Brautigan & Jansen, 2006).[4] Contribution by other sectors was very low: agriculture (11.5%), manufacturing (6%), construction (4.3%), utilities (1.1%) and services (22.1%) (Faber & Potter, 1971:9). Mining activities dominated in Zambia's economic structure. In turn, the economy was characterized by very limited industrial capabilities and a low agriculture base because the colonial government only concentrated on the extraction of copper and other minerals to build Southern Rhodesia and South Africa, their settler zones at the time (Mudenda, 2009).

Mudenda (2009) noted that, due to narrow industrial capabilities, the manufacturing sector remained underdeveloped, and the production base was thin and undiversified. The World Bank (1994) attributes this to weak backward and forward linkages between the mining and other sectors of the economy, including the agriculture and manufacturing sectors.

Driven by the urgent need to transform the economy structurally, the governing United National Independence Party (UNIP) adopted new economic reforms to promote economic diversification from a copper-dependent economy to agricultural and industrial development. The country started to expand its industrial capabilities through state-owned enterprises, the nationalization of private assets, especially the mines, and the promotion of an import-substitution industrialization strategy. Zambia's industrial policy was widely documented in many national development papers, including the *First National Development Plan* (1966-1970), the *White Papers* outlining the government's industrial policy (1964, 1970), the *Mulungushi*

[4] This period was characterized by booming copper prices (Brautigam & Jansen, 2006); however, industrial growth was weak as manufacturing value added as a share of GDP accounted only 6.9% (World Bank, 2019).

Economic Reforms (1968), the *Matero Economic Reforms* (1969)[5] and the *2nd National Development Plan* (1972-1976).

Since the late 1980s, Zambia's industrial policy has focused on value-addition, export promotion, and economic diversification into agriculture and manufacturing as ways to reduce copper dependency and tackle poverty. Since independence, the country has implemented three industrial strategies: first, *nationalization and import substitution* (1968-1990); secondly, an *Open-Market Industrialization Policy* (1991-2000); and lastly, *Export-Oriented Industrialization Policy.* All these changing phases of industrial policy have had little or no meaningful impact on Zambia's economy (UNDP, 2009). Chitonge (2016) observed that Zambian firms lacked global competitiveness because the industry had no competitive advantage in manufactured goods meant for export. The global market became increasingly complex as manufacturing activities became globally dispersed (Kaplinsky & Morris, 2016). Chitonge (2016: 796) further argues that "these – industrial policy – strategies were not geared towards diversifying the export base and foreign exchange revenue; the main focus was to produce consumer goods to meet the growing demands of the urban population."

Nonetheless, manufacturing still holds the potential to spur economic development (Page, 2012). However, Zambia needs to find its own manufacturing niches to rekindle its hopes of economic and industrial development (Kapya, 2016). This study identifies the agro-processing sector, using soya beans, as a critical driver for industrialization. We discuss the details of the soya bean value chain in section five.

3.2 State of Agriculture and Industrialization in Zambia

Agriculture traditionally provides the main support for Zambia's economy, especially for the rural sector. However, for years, the economy has struggled to raise agricultural output (see table 1) and labour productivity (see figure 1). In fact, the gap between the urban and rural

[5] Both the Mulungushi and Matero reforms paved the way for economic trade and an industrial policy transition from being widely liberalized and led by the private sector to a nationalized, state-led policy.

areas has been widening overtime. The recently published systematic job diagnostic for Zambia by the World Bank (2018) says this situation of a growing divide is associated with the failure to increase agriculture productivity among small-holder farmers.

Table 1 Trend in Zambia's agriculture and industry growth (2000-2016)

	Average Growth			Average Share of GDP		
	2000-2005	**2006-2011**	**2012-2016**	**2000-2005**	**2006-2010**	**2011-2016**
Agriculture, forestry & fishing	-1.1%	-0.3%	-0.8%	19.9%	11.9%	8.1%
Manufacturing	5.4%	5.6%	4.8%	9.8%	8.6%	7.9%

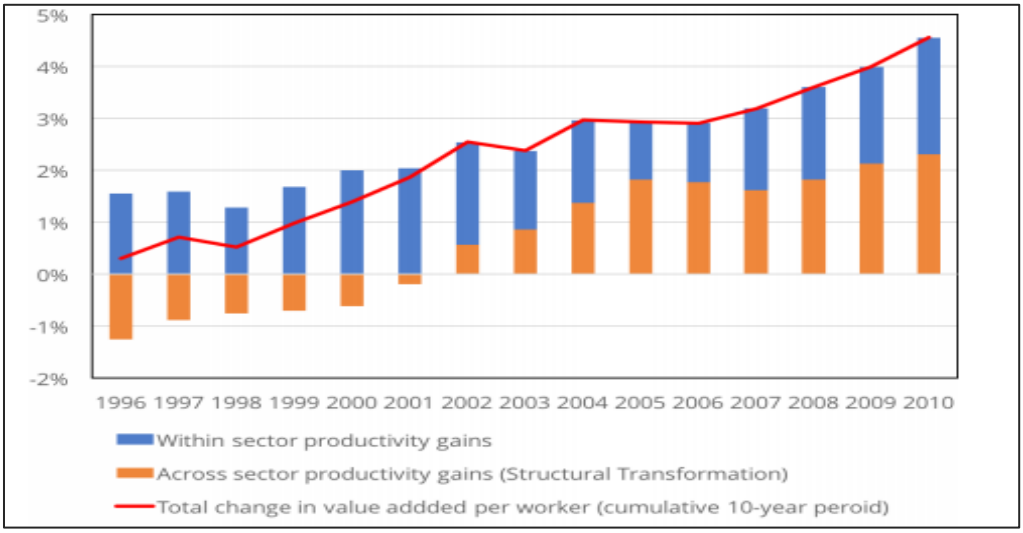
Source: World Bank Pink Sheets (2018: 31)

In 2018, the World Bank (2018) released a report on agro-led industrialization in Zambia that attempted to show the gains in within-sector productivity in the economy.[6] The report sought to understand whether Zambia experienced effective structural transformation given the trends in the economy between 1996 and 2010. The results reveal that Zambia underwent aggregate productivity growth from 1975 to 1987. Agriculture, manufacturing, transport, as well as the wholesale and retail sectors, all experienced negative growth. Additionally, there was a productivity decline in the manufacturing sector, mainly due to the absence of global competition, leading to a lack of technology upgrade and a loss of competitiveness by Zambian firms.

On the other hand, within-sector productivity growth started increasing in the late 1980s, driven by liberalization policies. However, the report noted that labour reallocation persisted on a negative trend because people simply moved from the State-Owned Enterprises (SOEs) to the agriculture sector and other less-productive areas, such as the informal sector.

[6] The study adopted the McMillian and Rodrik (2011) technique to decompose total labour productivity within in sector and reallocation across sector elements.

Figure 1 the Reallocation of Labour across Sectors, 1996-2010[7]; Labour Reallocation from Agriculture to Non-traded Sectors occurs after 2000



***Source**:* World Bank (2018: 32)

However, the post-2000 period saw the construction, mining, transport, and utilities record productivity gains. Further, labour reallocation from agriculture to non-traded sectors took place. Until 2010, the reallocation of labour produced growth because people moved to more productive industries than agriculture. Nevertheless, a significant proportion of employment growth happened in the trade and informal sectors, which by their nature, provide low wages and are often unstable. Therefore, the report concluded by stating that, "*while the reallocation of labour has generated productivity gains, it has not benefited the rural and urban poor. Structural transformation was not preceded by labour productivity gains in agriculture, and productivity gains in non-traded areas were low*" (World Bank, 2018:33).

Therefore, for an agriculture-driven structural transformation to succeed, developing countries such as Zambia need a "double revolution", that is, Zambia needs to combine new agricultural technological innovations with adaptation to its huge, diverse ecosystems (Otsuka, 2010). The need for smart agricultural technologies is even more urgent, particularly in the face of climate change, which is a potential threat to the agricultural sector.

[7] According to the World Bank (2018), labour reallocation only took place between 2000 and 2010.

Although Zambia has seen the deployment of technological innovations in recent years, mainly spearheaded by the private sector, through which the agriculture-driven industrialization strategy could be enhanced, the progress remains slow (Chapoto *el al.,* 2018). Modern biotechnology in the agriculture sector, such as genetically modified crops, which are still illegal in Zambia for crops such as soya beans, has the impetus to transform economic development (Collier, 2010). This is a policy issue that the Zambian government is still considering. Also, the lack of appropriate technology, poor extension services, and limited access to finance, especially for smallholder farmers, is likely to hinder agricultural transformation in the country (Ngoma *et al.,* 2018).

Modern activities involve adding value to agricultural produce and participating in global and regional agro-industrial value chains. But to enter the agro-value chains means that Zambia must learn to turn its agricultural raw materials into differentiated processed products. Entering agro-value chains has become increasingly complicated. This imposes industrialization challenges because of constraints related to food processing and safety, packaging, product certification and standards, logistics, and technology. The development of certain value chains like soya beans with the potential for upgrading and capabilities development in the agro-processing sector will lead to transforming of raw materials into high-value products.

3.3 Defining Agro-Processing and its linkages within the economy

The agro-processing industry refers to post-harvest activities that involve transforming, preserving, and preparing agricultural raw materials for either intermediate or final consumption (FAO, 1997). While agro-processing may consist of global-to-local patterns and local-to-global patterns, the Zambian agro-industry seems to involve the local-to-local patterns,[8] with a significant informal sector.

The development of the agro-processing industry is essential to providing sustainable growth and economic development. For most contemporary industrialized economies, agro-processing

[8] Global-to-local: involves processing imported agro-products to be sold in local markets; Local-to-global: processing of locally produced agricultural products for export; and local-to-local: processing of locally produced agro-products for domestic consumption.

has served as the entry point for industrialization. Similarly, the agro-industry has created new opportunities for African countries in the global market for processed agriculture products and horticulture. In the study by Newfamer et al (2018) on the "Industries without Smokestacks" documents Ethiopia, Ghana, South Africa, and Senegal having achieved extraordinary success in the agro-industry. For instance, in the horticulture sub-sector Ethiopia's 2015-2016 exports of cut-flowers reached about US$225 million making the country the second largest exporter in Africa. The agro-industry is an important source of employment, incomes, and pro-poor growth. Developing the agro-processing industry has a positive impact on economic development (Wilkinson and Rocha, 2009).

The agro-processing sub-sector mainly dominates the manufacturing activity in least developed countries. Agro-processing activities constitute 52%, 36% and 32% of the total manufacturing value added in Low, Middle and Upper-Middle income economies, respectively (UNIDO, 2013:2). These figures can even be higher in predominantly agro-centered economies. Therefore, agro-processing contributes significantly to an economy's output, and agro-products constitute a substantial portion of countries' exports. Agro-processed products are of higher value than agricultural raw products, and agro-processing is therefore crucial in the value creation process and export diversification (Fukase and Martin, 2017). On the other hand, evidence from Chisoro-Dube and das Nair (2018) on "industrialization of freshness" indicate that fresh fruits and horticulture products equally fetch more value in high-end markets than processed fruits. The use of highly advanced technologies to keep fruits fresh throughout the supply chain presents enormous opportunities to support industrialization.

Further, the agro-processing industries, especially those driven by small-scale holders in Africa (Woldemichael *et al.* 2017), are often situated close to the raw materials (Henson and Cranfield, 2008). Since they can be labour-intensive in nature, mostly at early stages of production, they provide opportunities for employment and income creation (Yumkella *et al.* 2011). The rural-based labour force is often characterized by low skills and remains trapped in less productive agricultural ventures (Figueroa *et al.* 2018), thus limiting rapid growth and structural change (Collier and Dercon, 2014). Nevertheless, Wilkonson and Rocha (2009) argue

that agro-processing activities offer better wages and could employ a less skilled and semi-skilled workforce.

The Hirschman (1958) unbalanced growth strategy of selecting key industries that are strongly interdependent with others in the economy provides a valid argument for developing the agro-processing industry. As explained by Yotopoulos and Nugent (1973) and FAO (1997), the strategy suggests prioritizing investment in non-primary sectors that use larger amounts of raw materials and intermediate products than other sectors in the economy (backward linkages) and also in non-final products whose output could be exploited as inputs and encourage production in other sectors (forward linkages). Therefore, the agro-processing industry's development is aimed at facilitating the creation of backward and forward production linkages in the economy.

The linkages between agricultural production and agro-processing are, therefore, important. Agro-processing industries can expand both markets and the demand for agricultural products and thus raise agricultural production (Watanabe *et al.* 2009; Wilkinson and Rocha, 2009). This creates incentives for agricultural commercialization, which is central to structural transformation and economic development. The need to meet the increased demand for diversified and processed food products leads to the adoption of modern technologies, which consequently boost productivity and raise incomes in the economy. Commercialization is also promoted by transforming, through processing, non-tradable products into tradable ones (Ehui and Delgado, 1999). Processing also reduces post-harvest losses, which occur in most African economies, creating value from what could be lost to spoilage, and adding nutritional value to food (Infodev, 2018).

The next section looks at the policy environment relevant to the sector considering the role of agro-processing in economic development.

3.4 The Policy Environment: industrial policy relevant to agro-processing industry

Reviewing the industrial policy framework related to agro-processing is essential to identifying strategies and prioritization areas for structural transformation in Zambia. However, the key

issue is determining to what extent the industrial policy is embedded as a national development agenda and what strategies and instruments have been established to promote value-addition and industrial development.

Largely, Zambia's industrial development goals have been driven by the National Vision of 2030, which aims to transform Zambia into a middle-income country by 2030. According to its industrial policy,[9] Zambia aspires to be "*an industrialized and competitive nation with a diversified, innovative and globally competitive industrial base, which contributes to sustainable growth and employment creation by 2027.*" The policy focuses on eight (8) manufacturing sub-sectors as growth areas to support industrialization to achieve this vision. These sub-sectors include processed foods, textiles and garments, wood and wood products, leather and leather products, and engineering products, with agriculture, construction, health, education, ICT, and energy as supportive sectors.

Table 2: Key Industrial Development Strategies for Zambia

Industrial Development Strategies
Zambia National Industrial Policy of 2018
Industrialization and Job Creation Strategy
National Standards Strategy (2020-2022)
National Quality Policy
Small and Medium Enterprise Policy

Source: Ministry of Commerce, Trade and Industry (2018)

Further, Zambia's industrial policy outlines various strategies upon which the agro-industrial development could support industrialization. These include, among others, to:

- *Identify and support value chains that represent the greatest number of prospects for value addition in the priority sectors;*
- *Support the formation of industrial and value chain clusters in the labour-intensive growth sectors;*

[9] http://www.zda.org.zm/sites/default/files/National%20Industrial%20Policy%202018.pdf

- *Promote investment in supportive infrastructures such as transport, communication, energy, and education through public-private partnerships;*
- *Promote innovation, technological capabilities, research and development, and commercialization of innovations;*
- *Facilitate technological transfer into local industrial production processes; and*
- *Facilitate the establishment and accreditation of competent laboratories and certification bodies that will assure the quality of local products.*

Given Zambia's poor industrialization experience as discussed in section 3.1, what, then, are the key ingredients needed to facilitate the successful industrial development through the agro-industrial sector?

Drawing on lessons from successful economies that have industrialized, there are various policy interventions that Zambia can take inspire its growth and development. Although of industrial development patterns differ across countries, economies follow a common trajectory, moving from labor-intensive industries such as agro-food processing, textiles, garments, and light manufacturing to more capital-intensive industries.

As noted, the Zambian government identified vital value chains and selected industries have been prioritized as growth areas. But to make industrial policy more effective, the government must provide support to new and old domestic firms and encourage investments through incentives.[10] These incentives should ordinarily be combined with conditions that stimulate competitiveness. For instance, the South-East Asian economies set export targets to ensure that firms become and remain competitive. Part of getting this right is to set up incubation initiatives to catalyse the private sector's entry and participation. Nevertheless, interviews with the Zambia Chamber of Commerce and other informants in Lusaka report that the lack of systematic and consistent engagement between the government and the private sector

[10] The Zambia Development Agency (ZDA) Act of 2006 provides an enabling environment for investors through "*fiscal incentives and non-fiscal incentives*" provided they invest in the following agricultural and agro-processing related priority sub-sectors: processed foods; beverages and stimulants; floriculture; production and processing of textiles; and leather products.

constrains the agro-industry. The government must make deliberate efforts to examine and address obstacles that prevent new domestic firms from upgrading their products quality. This will, in turn, unlock opportunities, provided the government pays close attention to product innovations by domestic firms and offers support for firms to scale up. The advantage of doing this is that rapid technological progress creates many new opportunities (Otsuka, 2016).

However, all this will not happen until poor infrastructure and an unfriendly business environment are addressed. Inadequate infrastructure, for instance, in energy and logistics, slows the manufacturing and agro-processing industries' growth. Operating in a landlocked country, compounded by limited economies of scale and a tough economic environment, disadvantages the agro-industry as it incurs heavy transportation and logistical costs, which ultimately affect the competitiveness of the final products.[11]

As part of the implementation of the industrial policy, the government has encouraged the establishment of agro-processing firms in commercial farming blocks and multi-facility economic zones, while at the same time ensuring the provision and installation of key infrastructure, which includes trunk roads, electricity, dams, and other social services. The Agro-Luswishi Industrial Farm Block,[12] a joint venture with Tahal Zambia, is one of the initiatives established to encourage Zambia's commercial farming and processing staple crops so as to enhance growth and rural industrialization. The main priority crops identified for investment in the farm blocks are soya beans, maize, wheat, sugar, cotton, tea, coffee, cassava, groundnuts, sorghum, and sunflower.

However, Zambia's industrial policy has been criticized for being generally broad and overambitious, leading to poor policy consistency, poor coordination, and implementation challenges. For instance, although Zambia recognizes agriculture as a growth sector and has selected soya beans as one of the critical agro-value chains, Imakando (2017) and Markowitz

[11] Interview with Zambia Chamber of Commerce (30th August 2019) and Private Enterprise Programme Zambia (22nd August, 2019).

[12] https://www.afdb.org/en/documents/document/zambia-zambia-staple-crops-processing-zone-scpz-luswishi-farm-block-lufwanyama-district-copperbelt-province-zambia-esia-summary-102629

(2018) observe no specific policy support for soya bean production, particularly not any aimed at increasing smallholder participation. A properly aligned and nuanced industrial policy must be developed to take advantage of the soya beans trade's regional and global dynamics.[13]

Additionally, international product standards are a binding constraint on Zambia's agro-industry. Most domestic food firms lack either the technical skills or the basic knowledge of good manufacturing practices (GMPs) needed to implement food safety and standard procedures (Phiri & Ziba, 2016; Chigumira, 2019). Global consumers are now sensitive to health, food safety, and environmental standards, which Zambia's industrial policy has been struggling to achieve, especially for processed foods destined for export markets. It is hoped that the recently launched first-ever national standards policy (2020-2022) will be able to address some of food safety and standard issues. A total of 484 standards covering various sectors, including agriculture and manufacturing will be developed or adopted and implemented to enhance the quality of products and services. The policy also emphasizes developing and adopting standards to support Micro, Small and Medium Enterprises (MSMEs), address quality-related challenges for environmental protection and rural industrialization (Republic of Zambia, 2019).

3.5 Opportunities and Potential of Agro-Processing

Zambia's agro-processing remains underexploited and as such, there are numerous opportunities in the industry. Availability of arable land, access to water, favourable climatic conditions, and youthful labour force allow the cultivation and production of several agricultural commodities. This means that the country has potential to support agro-processing industry as it produces output that can be sold to other sectors as intermediary inputs for value addition processes.

However, the state of value addition is weak and agricultural products are sold either in domestic markets or international markets mostly as unprocessed export commodities. Consequently, this has made the agro-processing sector underdeveloped over time relative to countries like South Africa. On the other hand, Zambia has undergone substantial population

[13] Interview with a policy analyst at the Zambia Chamber of Commerce, August 2019

growth and rapid urbanization together with rising incomes over the last few decades. As a result, food production, especially processed food does not keep pace with demand, thereby leading to high and increasing food imports. The production of processed food thus represents a clear unexploited opportunity for industrial development.

According to World Bank (2013) estimates, the African continent will have a market more than US$400 billion for urban food by 2030. The Bank further says that Zambia is expected to experience similar food demand trends, which is likely to increase more than threefold in the next 15 years, generating over US$25 billion. As African countries, including the SADC bloc, are undergoing the so-called "nutrition transition," there have been substantial changes in consumption patterns towards more diversified processed foods and to consumers relying more on supermarkets to supply their food requirements (Lall *et al.,* 2017; UNECA, 2017).

Therefore, building and maintaining capabilities for agro-food processing firms in Zambia, becomes a crucial part of an industrial development agenda seeking to stimulate agro-processing and manufacturing activities as regional trade grows (Nkhonjera & das Nair, 2018). Developing the food sector in Zambia requires establishing industrial capabilities alongside certification, testing, packaging, technology, and logistics. Nevertheless, a key insight from studies on regional industrialization and value chain analysis indicate that these are underdeveloped, including the agro-food processing industry (Chisoro-Dube *et al.,* 2018). On the other hand, Zambeef,[14] an indigenous Zambian agro-processor, is making headway and currently operates 174 retail outlets countrywide and 31 in West Africa (including 26 in Nigeria and 5 in Ghana) (Zambeef Annual Report, 2018: 8). Such developments can to fuel both local and regional industrialization and support Zambia's economic transformation agenda.

A study by Paremoer (2018) that sought to explore the linkages between and opportunities in the agro-processing sectors across the SADC region highlights that the region has recorded sustained food deficits in processed foods such as wheat, cereals, and edible oils. As part of industrialization, increasing food-processing activities to shift to productive, higher-value, and

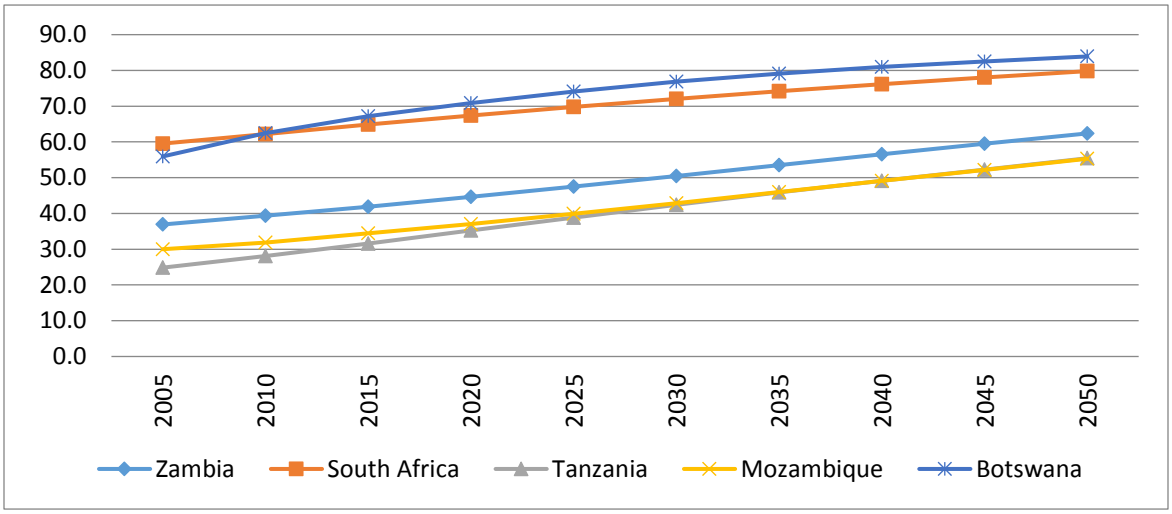
[14] https://zambeefplc.com/annual-reports/

more sophisticated products remains a daunting challenge across the SADC region and each economy starts from a different base.

3.5.1 Trends in Population Growth and Urbanization

Population growth and rapid urbanization are key drivers for the demand of value-added and diversified processed foods, both locally and internationally. In 2016, there were an estimated 1.2 billion people in Africa. This is expected to double to 2.4 billion by the year 2050 (AfDB, 2017: 4). This remarkable population explosion is likely to induce more people to move into urban areas. Figure 3 shows that Botswana and South Africa are expected to have 83.9% and 79.8%, respectively of their populations residing in urban areas in 2050. Similarly, Zambia is also expected to have 62.4% of the population by 2050 residing in urban areas compared to 41.9% in 2015.

Figure 2 Percentage of Population Living in Urban Areas (2005-2020)



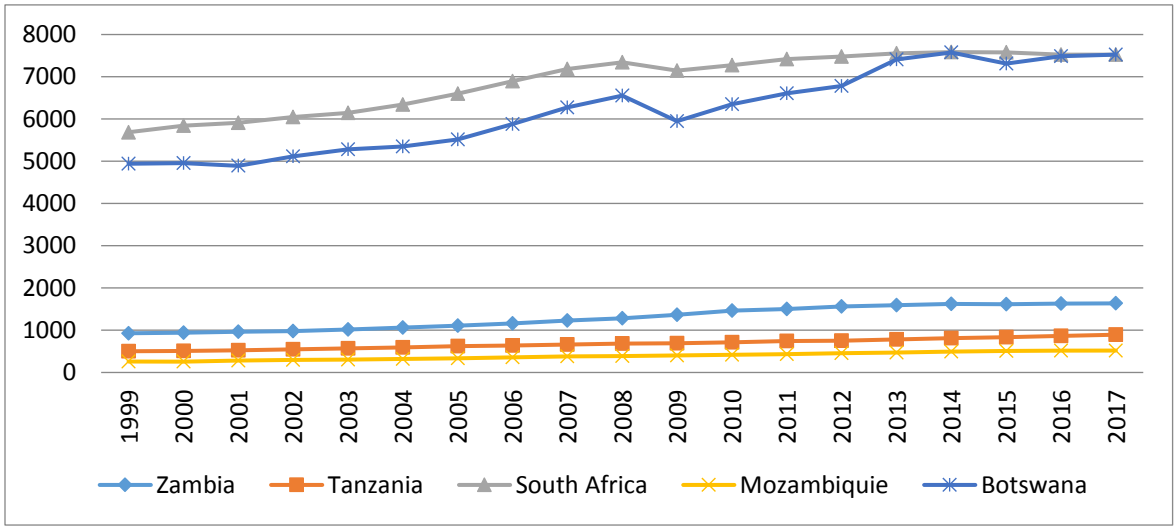
Source: Author's compilation using UN World Urbanization Prospects (2018) data **Notes**: Retrieved from https://population.un.org/wup/Download/, April, 2019

3.5.2 Trends in Income

Alongside high population growth and urbanization, incomes have also grown significantly in countries such as Botswana, Tanzania, Mozambique, and Zambia. Although South Africa

incomes have stagnated post-2008/9 global financial crisis, in absolute terms, the economy remains an essential market for processed foods (figure 3).

Figure 3 GDP per Capita, Constant 2010 US$



Source: Author's compilation using World Development Indicators **Notes**: Retrieved from https://databank.worldbank.org/data/source/world-development-indicators, April, 2019

Despite the volumes of agricultural productions and vast arable land, agriculture in Zambia is yet to impact food security and sustainable development. Regionally, urbanization, and income growth presents substantial opportunities for the development of the Zambian agro-processing sector.

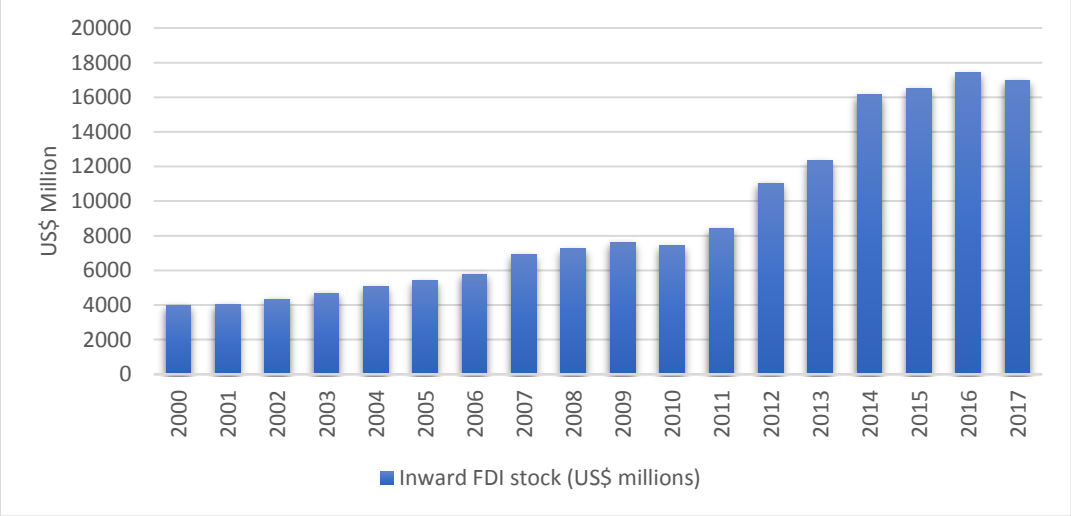
4. PATTERNS OF GROWTH AND DEVELOPMENT OF THE AGRO-PROCESSING SECTOR IN ZAMBIA

This section explores the patterns of growth in the agro-processing sector. This is done by looking at some key developments in the sector in terms of investment, contribution to GDP, value-added, employment, and agro-products trade. Fundamentally, agro-industry is one of the cornerstones of Zambia's economic growth and development.

4.1 Investment in Agriculture and Agro-Processing

Strengthening the agro-industry can provide significant upstream linkages to the agricultural sector. It can be an essential productivity driver, supporting the transfer of labour and resources towards agro-processing (transport, storage, processing, wholesale and retail of processed food), which is crucial for rural industrialization (World Bank, 2018). However, this must be combined with improving the investment climate to support the commercialization of agriculture and agro-processing productive capabilities, as well as linking local food manufacturers to domestic, regional, and international markets.

Figure 4 Zambia's Inward FDI Stock between 2000 and 2017, US$ millions

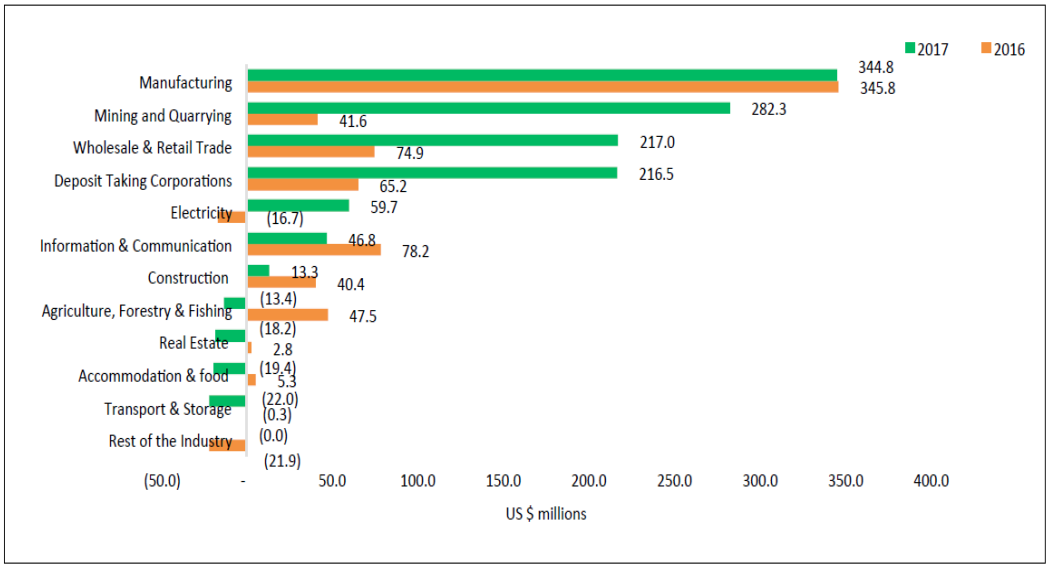


Source: Author's compilation using UNCTADSTAT dataset

Notes: FDI stock in US$ millions. Current exchange rate applies. Database retrieved from https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx, UNCTADSTAT

As depicted in figure 4, Zambia's stock of FDI has substantially grown from US$4 billion in 2000 to US$17 billion in 2017. The mining and quarrying industry is a dominant recipient of FDI in terms of stock. The size of the FDI inflow into the mining industry is explained by its perceived profitability, based on return on equity, as can be seen by its substantial growth from US$228.6 million in 2016 to US$912.7 million in 2017 (Bank of Zambia, 2018: 32). On the other hand, Bank of Zambia (2018) also noted an upswing in FDI stock, especially for the manufacturing sector and agro-processing related activities, making these industries the second in profitability (return on equity) to FDI, albeit recording a decline to 11.9% in 2017 from 17.9% in 2016.

Figure 5 Foreign Direct Investment Inflows by Industry, 2017



Source: Bank of Zambia (2018; 31), Foreign Private Investment and Investor Perceptions Survey.

Further, figure 5 indicates that the manufacturing sector[15] received the highest net FDI inflows by industry in 2018, with a significant proportion, valued at US$344.8 million, going to agro-processing (mainly in vegetables and edible oils), which accounted for 31.3% of the total inflows (Bank of Zambia, 2018:31). Additionally, Chigumira (2019:2) reports that the Zambian government, with assistance from the World Bank, invested US$40 million in the Zambia Agribusiness and Trade Project, intending to boost agro-processing activities in the country.

[15] Mostly in cement and metal production, the Bank of Zambia (2018) perceptions survey noted

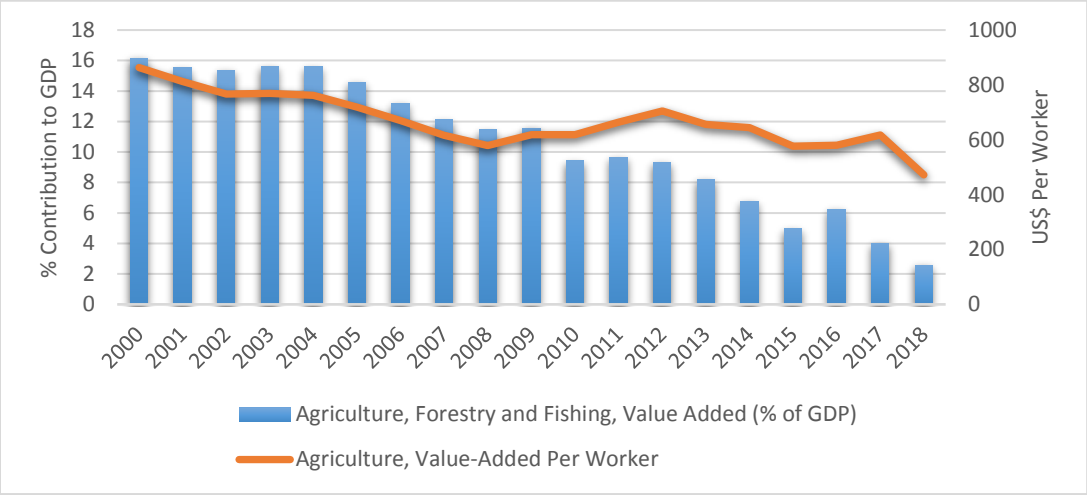
Tellingly, Zambia seems to be attracting significant FDI, which could spur industrialization if well harnessed. The economy is an attractive destination for setting up agro-industries because it provides access to agricultural inputs for processing, land, labour, and water, and barriers to entry are still limited (Cramer & Sender, 2015; Chigumira, 2019). Nevertheless, the fundamental question is to what extent is this growth and investment stimulating manufacturing capabilities in the agro-processing sub-sector in Zambia?

4.2 Agro-Industrial Production

In Zambia, agricultural potential remains underexploited, although the economy has experienced a rapid transformation of its food and agricultural systems (Greenberg *et al.,* 2018). This transformation is characterized by a transition of consumption patterns in rural and urban areas, medium- and large-scale commercial agricultural investments, the expansion of supermarkets, and changing incentives for FDI and deepening regional integration. Agriculture has thus far received increasing attention from both the government and the private sector, both of which seek to harness its potential for industrialization (Chapota *et al.,* 2018).

On the other hand, the development of the agricultural sector has remained low as a share of GDP. In the last decade, agriculture registered a declining contribution to GDP, averaging slightly above 6%. Another indicator of structural transformation is labour productivity. As can be seen in figure 6, labour productivity is falling. The main reason for this declining trend is that workers are employed in lower-productivity areas, mainly in the non-wage agriculture and the informal sector (Resnick & Thurlow, 2014). Small-scale farmers' inability to acquire productive assets and innovative finance is another factor (Chapoto et al., 2018). Establishing strong linkages between agriculture and manufacturing (driven by agro-processing) is crucial for Zambia's industrial development. The current low productivity levels in sectoral output and labour cannot potentially induce structural transformation.

Figure 6 Contribution of Agriculture to GDP and Value-Added Per Worker, 2000-2018



Source: Author's compilation using World Development Indicators (WDI) data

4.3 Agro-processing Output Shares and Manufacturing Value Added

Unlike in the past, where mining was Zambia's main economic pillar, the agro-processing industry contributes a significant proportion of the manufacturing output shares and value-added, and employment. The share of agro-industrial activities in total manufacturing is relatively high. Figure 7 shows the trend for manufacturing value-added over 17 years. Growth rates have been reasonable, albeit volatile.

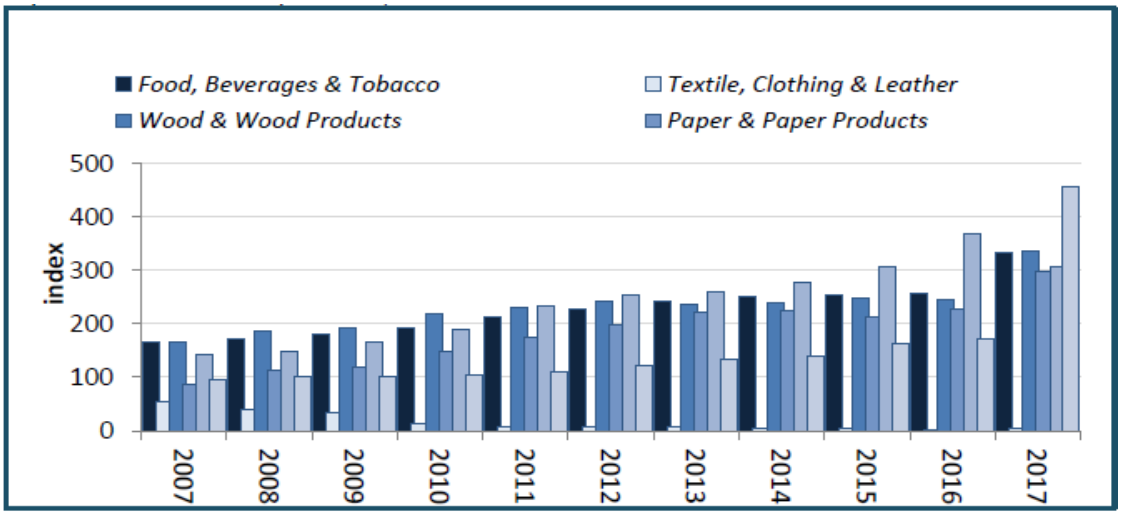
Figure 7 Manufacturing Value-added (annual % growth), 2000-2017

Source: Author's compilation using World Development Indicators (WDI) dataset

Notes: Retrieved from https://databank.worldbank.org/data/source/world-development-indicators

The agro-industry sector generally accounts for a substantial portion of total manufacturing output in Zambia (see Figure 8). The average contribution of the agro-processing sub-sector to Zambia's GDP is 11% (Chigumira, 2019: 7), and as a share of total manufacturing output is estimated to be 63% (UNDP, 2016: 45). Food and beverages are the leading contributors to manufacturing agro-processing activities.

Figure 8 Index of industrial production, agro-processing sub-sector (2007-2017)



Source: Chigumira (2019)

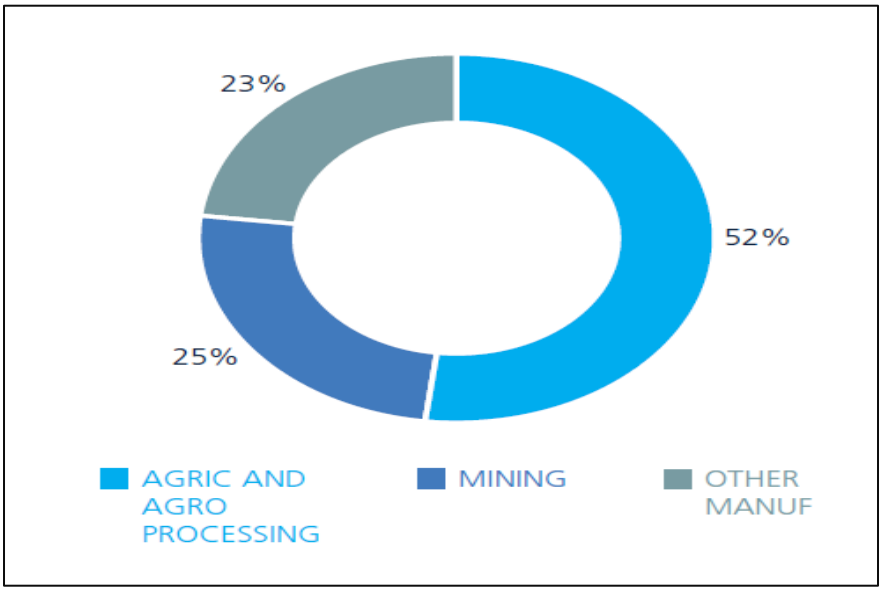
Within the broader economy, agro-processing activities could provide potential ways for other sectors of the economy in Zambia to generate substantial spinoffs. This is because, for example, the food; beverages and tobacco (agro-processing) sub-sector tends to exhibit strong backward linkages to other sectors, such as agriculture, which supplies a significant proportion of its intermediate inputs and outputs (Chisoro *et al.,* 2018). Also, at a manufacturing level, food processing has strong internal linkages with a substantial share of its intermediate inputs and outputs traded within the sector. In the downstream sector, food processing also has strong forward linkages to the wholesale and retail trades and other sectors such as transport and storage (Chisoro *et al.,* 2018).

4.4 Agro-Processing Industry Contribution to Employment

As a manufacturing sub-sector, the agro-processing industry, combined with suitable labour laws and other structural interventions, could also contribute to job creation given the

backward and forward linkages that typify the sector. According to UNECA (2014), agro-processing plays a significant role in employment creation and value-addition for both developed and developing economies. Nonetheless, according to the latest labour survey, Zambia's manufacturing employment remains low, currently standing at 239 000 out of 2.9 million employed persons, (CSO, 2019: 30).

Figure 9 Non-Service Jobs in Zambian Firms, 2010



Source: Adapted from Jobs Diagnostic Zambia, World Bank (2018: 8)

Nevertheless, the growth of and investments in commercial farming and agro-processing have ignited the potential to stimulate industrial growth, especially regarding job creation. These sectors are crucial because they tend to be more labour-intensive than mining activities and potentially have more supply-chain links, which could be necessary for Zambia's economic diversification and job creation. Figure 9 indicates that agricultural and agro-processing employment in firms constituted 52% of non-construction jobs in the industry in 2010, compared to mining jobs (25%). In fact, the linkage of more than 400, 000 small-holder farmers to processing by private firms through integrated out-grower schemes is a significant stride towards boosting agro-driven job creation (World Bank, 2018).

Table 3 Type of Employment by Industry, selected sectors (in thousands)

Industry	Type of Employment							
	Total Employment					Formal Employment		
Labour Force Survey	2005	2008	2012	2014		2005	2008	2012	2014
	4,132 (100%)	**4,607 (100%)**	**5,500 (100%)**	**5,859 (100%)**		**496 (12%)**	**511 (11%)**	**847 (15%)**	**630 (100%)**
Agriculture, Forestry & Fishing	2,984 (72.2)	3,284 (71%)	2,872 (52.2%)	2,864 (48.9%)		30 (1%)	72 (2%)	87 (3%)	52 (8.2%)
Manufacturing	55 (1.3%)	159 (3.5%)	217 (3.9%)	224 (3.8%)		19 (34%)	37 (23%)	35 (34%)	45 (7.1%)

Source: Labour Force Surveys (2005, 2008, 2012, 2014), Central Statistics Office and Fessehaie *et al.* (2015)

Table 3 shows the types of employment by industry for agriculture and the manufacturing sector. Of the total of 5 million jobs in 2014, 3.8% were employed in the manufacturing sector, rising from 1.3% in 2005. Other sectors such as agriculture, forestry and fishing accounted for 48.9% of jobs in 2014, a decline from the 72.2% recorded in 2005. CSO data shows that a significant proportion of people are operating in the informal sector, hence undermining economic productivity. However, promoting agro-processing could help boost productivity in the economy.

4.4 Agro-Industrial Sector Trade Performance

Table 4 shows the significance of agricultural trade to Zambia and other southern African countries, reflecting the values (US$ million) of trade in agricultural products, and the share of this trade in the country's total trade, the years 2010 and 2017.

The results show that trade in agricultural products varies significantly across countries. Zambia was a net exporter of agricultural products in 2017. In terms of importance in trade, exports of agricultural products made up only 7% of Zambia's total exports in 2017. Maize and maize products, sugar, tobacco, cotton, and stock feed are among the top export products for Zambia. Soya beans from which stock feed is produced are an attractive input in the poultry and livestock value chain, edible oil industry and other products for human consumption, such as

soymilk. Turning to imports for 2017, agricultural products make up a low share of total imports in Zambia and South Africa, and substantial share (15% and above) in Angola, Zimbabwe, and Mozambique. Given its size, South Africa dominates by a substantial margin both exports and imports in terms of value.

Table 4 Agricultural Trade for SADC Countries and the World

Country	Absolute value of agricultural trade (US$ million)				Agricultural trade as a proportion of total trade (%)			
	Exports		*Imports*		*Exports*		*Imports*	
	2010	**2017**	**2010**	**2017**	**2010**	**2017**	**2010**	**2017**
Angola	57	295	5600	5660	0.1	0.4	15	18
Mozambique	696	1020	840	1710	16	11	12	15
Malawi	1640	1590	581	632	77	90	13	12
Namibia	2920	2340	1810	1860	25	22	15	14
South Africa	17000	19700	11300	13500	10	11	7	8
Zambia	901	1200	522	1020	6	7	5	6
Zimbabwe	1220	1980	2140	1480	19	28	18	15

Source: Authors compilation from UN Comtrade

This study noted a lack of strength in regional agricultural trade due to persistent and large food deficits. Southern African economies, including Zambia and southern African economies, have struggled to show significant growth in agricultural products- processed or unprocessed. Further, the unbalanced nature of trade in agro-products within the region has seen South Africa continue dominating its presence, providing a substantial proportion of many countries' regional markets. In 2018, South Africa's agricultural exports to the region amounted to US$3.3 billion, with imports of US$1.09 billion, up from US$3.35 billion and US$.096 billion in 2010 (UN Comtrade, 2019). Zambia's agricultural exports to southern Africa, as a share of total intra-regional agricultural exports, have remained very low at 4% between 2010 and 2017 (UN Comtrade data, 2019).

Table 5 shows substantial trade deficits of agricultural products-processed and unprocessed-between Zambia and the SADC region. On one hand, Zambia has maintained a positive food trade balance in certain commodities since 2016. According to trade map data, in 2018, the

largest contributing value-chains to the trade surplus were sugars and sugar confectionery, beverages, spirits and vinegar, residues and waste from the food industries, cereals and oilseeds (see table 5). These value chains' export potential reflects Zambia's capability to be among the leading producers and exporters of food items in the regional markets. Despite this promising trend, the main challenge is how to stimulate manufacturing capabilities and improve the agro-products' competitiveness through the agro-processing sector.

Table 5 Trade balance between Zambia and the SADC, 2016-2018 (US$ thousand)

HS Code	Product label	Value in 2016	Value in 2017	Value in 2018
02	Meat and edible meat offal	(2,999)	(836)	315
03	Fish and crustaceans, molluscs and other aquatic invertebrates	(93,226)	(117,724)	(101,124)
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere ...	(9,016)	(5,931)	(5,808)
07	Edible vegetables and certain roots and tubers	(3,311)	(2,209)	(3,096)
08	Edible fruit and nuts; peel of citrus fruit or melons	(17,290)	(12,111)	(15,159)
09	Coffee, tea, maté and spices	(6,758)	(7,765)	(7874)
10	Cereals	174,938	36,826	11,119
11	Products of the milling industry; malt; starches; inulin; wheat gluten	2,141	5,713	(4,982)
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal ...	14,868	50,897	3,173
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	(1,606)	(1,089)	(801)
17	Sugars and sugar confectionery	71,895	83,069	76,834
18	Cocoa and cocoa preparations	(4,108)	(4,762)	(4,862)
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	(12,829)	(14,507)	4276
20	Preparations of vegetables, fruit, nuts or other parts of plants	(15,946)	(21,985)	(23,894)
21	Miscellaneous edible preparations	(19,217)	(24,951)	(25,389)
22	Beverages, spirits and vinegar	(6,185)	9398	34882
23	Residues and waste from the food industries; prepared animal fodder	6007	35250	50212

Source: Author's compilation using data from ITC Trade map

***Brackets **()** represent value chains where Zambia experienced trade deficits.

Zambia has also witnessed consistent and substantial food trade deficits in key food products such as fish and fish products, edible fruits and nuts, preparations of vegetables, dairy produce, meat products, and coffee. The ITC trade data indicate that the biggest contributors to Zambia's food imports include fish, miscellaneous edible preparations, prepared vegetables, fruits and nuts, and dairy products. This trend is mainly driven by the expanding middle class, accompanied by rising incomes. Urban households consume more processed food products, the demand for which is currently unmet by the local food industry (Fessehaie *et al.,* 2015).

Therefore, there is therefore potential for the local food industry to grow and tap into the growing domestic and regional markets, particularly in the food processing industry.

4.4.1 Imports of Processed Food Products

Turning to food imports, table 5 identifies fast-growing imports in Zambia. The importation of fish products rose from US$77 million in 2014 to US$110 million in 2018; with an annual growth rate of 9% p.a. Namibia was the leading source of fish, accounting for approximately 84% of the total quantity of fresh fish imported to the Zambian market. Other significant imports were in beverages and dairy products. Imported beverages increased from US$38 million in 2014 to US$40 million in 2018 and US$29 million in 2014 to $US36 million over the same period, a growth of 4% p.a. and 5% p.a, respectively. South Africa remained the primary source of processed foods, including vegetables, cereals, prepared fruits, and nuts.

On the other hand, there was a declining rate of imports in selected, processed foods, such as cereals, fish, and vegetables at the beginning of 2017. These trends represent the growing import substitution strategy and export bans on cereals taken by the domestic food industry in Zambia (Paremoer, 2018), reflecting Zambia's wish to participate in the trade as regional economic integration deepens. For instance, through the Citizens Economic Empowerment Commission (CEEC), the government provides loans to Zambian entrepreneurs willing to invest in the aquatic value chain to counteract the heavy imports of fish.[16]

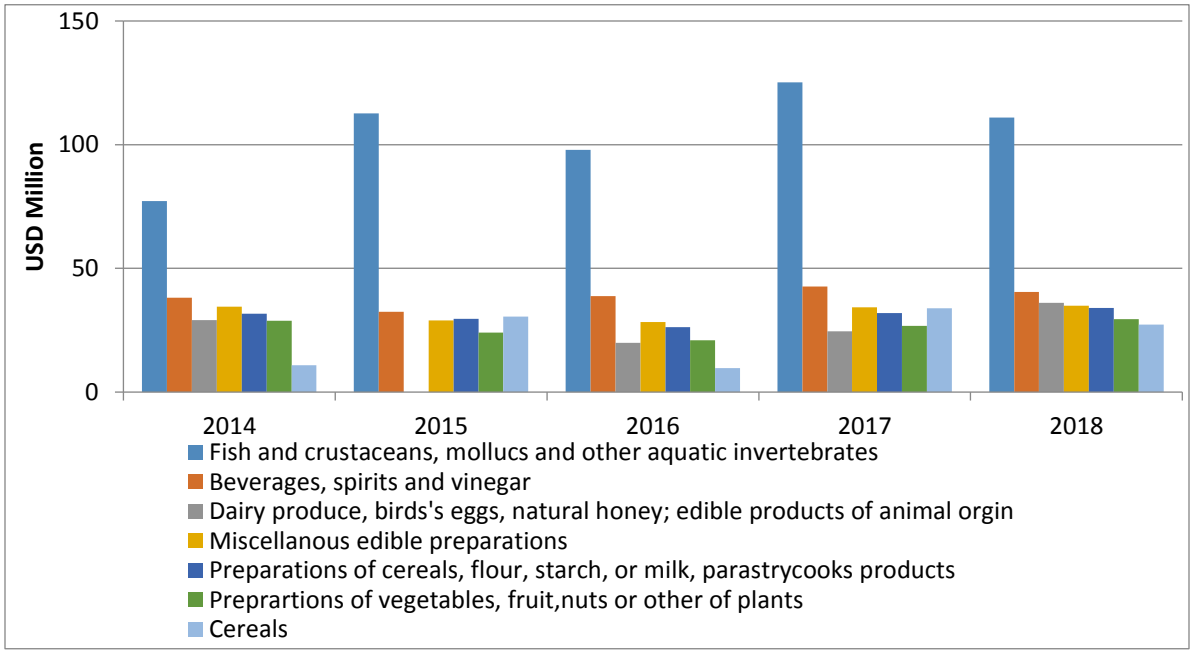
[16] Interview with a government official from the Citizens Economic Empowerment Commission (CEEC), 25th July 2019

Table 6 Zambia's Top Imports Agro-processed Foods, sorted by value in 2018

	Value of Imports (US$ thousands)							
HS Code	**Product Label**	**2014**	**2015**	**2016**	**2017**	**2018**	**Annual growth in value 2014-2018 (%, p.a)**	**Top Source (2018)**
03	Fish and crustaceans, molluscs and other aquatic invertebrates	77,271	112,600	97,932	125,165	110,996	9	Namibia (84%); China (8%)
22	Beverages, spirits and vinegar	38,082	32,472	38,795	42,722	40,254	4	SA (85%); Namibia (6%)
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	29,072	23,701	19,949	24,589	36,015	5	SA (48%); New Zealand (9%)
21	Miscellaneous edible preparations	34,464	29,012	28,320	34,278	34,849	2	SA (77%); Kenya (10%)
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	31,639	29,658	26,225	31,980	33,952	2	SA (75%); Zimbabwe (6%)
20	Preparations of vegetables, fruit, nuts or other parts of plants	28,827	23,998	20,921	26,743	29,529	2	SA (28%); Zimbabwe (5%)
10	Cereals	10,795	30,530	9,649	33,845	27,308	22	SA (28%); Mozambique (28%)

Source: Author's compilation using ITC Trade map dataset Retrieved from https://www.trademap.org, June, 2019

Figure 10 Top Imports of Agro-processed Foods, 2014-2018



Source: Author's compilation using ITC TradeMap dataset

4.4.2 Exports of Selected Processed Foods, 2014-2018

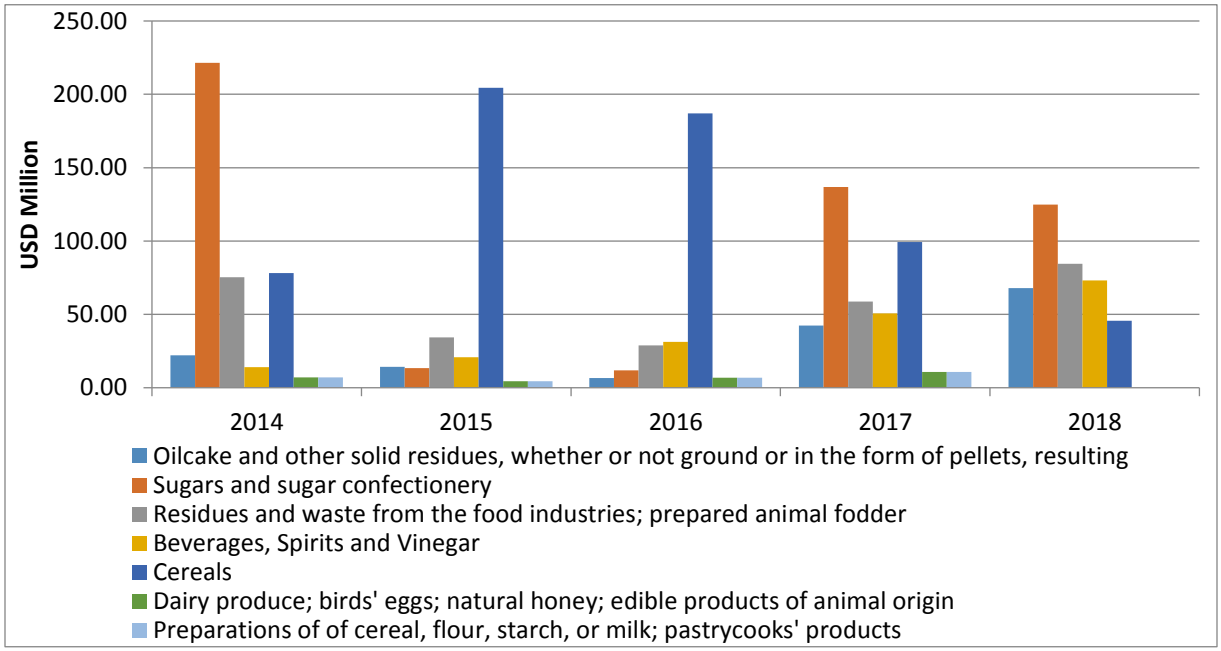
The export of high-value products contributes to promoting economic diversification, foreign earnings, and job creation. Although Zambia's export portfolio is largely dominated by primary commodities, such as copper, cobalt, and raw maize, which constitute over 75% of total exports (Fessehaie *et al.,* 2015), there are promising agro-value chains with potential for industrial upgrading. Table 6 and figure 12 show agro-value chains with export potential and that are suitable for industrial upgrading.

Table 6 Zambia's Top Exports in Agro-processed Foods, sort by value in 2018

	Value of Exports (US$ thousands)						
HS Code	**Product Label**	**2014**	**2015**	**2016**	**2017**	**2018**	**Annual growth in value 2014-2018 (%, p.a)**
17	Sugars and sugar confectionery	221,561	13,4701	11,8750	136,820	124,782	-11
23	Residuals and waste for food industries: prepared animal fodder	75, 230	34, 368	28, 853	58, 669	84, 588	8
22	Beverages, spirits and vinegar	14,100	20,767	31,159	50,748	73,071	52
10	Cereals	78,155	204,473	187,010	99,365	45,700	-16
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	14,248	9,043	10,961	14,891	34,562	25
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	6,966	4,537	6,741	10,848	17, 294	31
07	Edible vegetables and certain roots and tubers	11,482	11,460	13,169	14,032	11,624	2
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	34,074	16,005	23,298	57,354	11,097	-9
21	Miscellaneous edible preparations	10,097	7,719	3,822	4,578	7,829	-10

Source: ITC Trade map Retrieved from https://www.trademap.org, June, 2019

Figure 11 Top Exports of Agro-processed Foods, 2014-2018



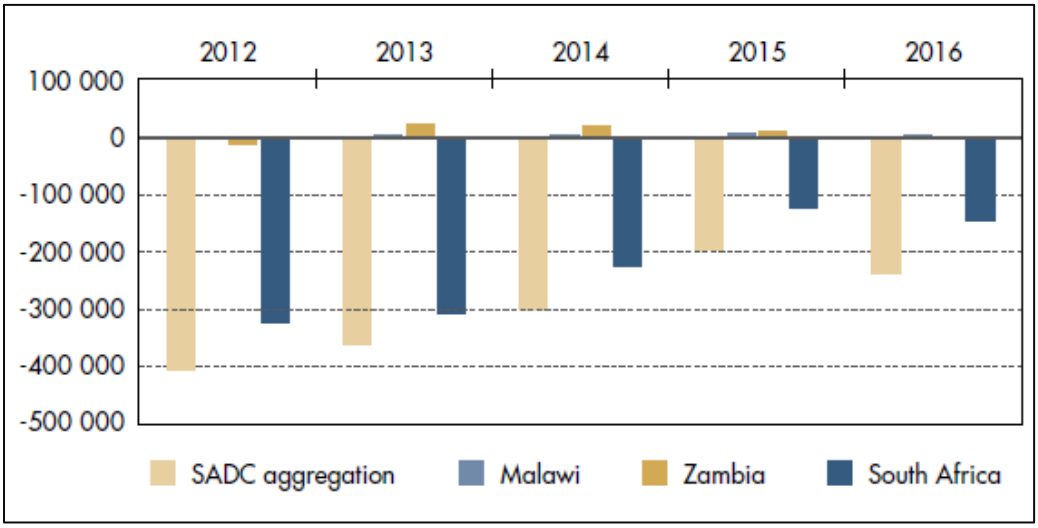
Source: Author's compilation using ITC TradeMap dataset

Data from ITC reveals that Zambia's leading exports of processed agro-products were in sugars and sugar confectionery, beverages, cereal and products of the milling industry, and oilcake. In 2018, the largest markets for food exports were sugars and sugar confectionery exported to the Democratic Republic of Congo, Kenya, Rwanda, and South Africa. However, sugar and sugar confectionery have come under pressure in recent years, as evidenced by negative 11% annual growth over a five-year period following the declining export of raw sugar and confectionery products. In turn, this has constrained the downstream sector, including the confectionery industry. Although Zambia and South Africa can produce sugar, the SADC region still faces sugar deficits, which has negatively impacted their ability to manufacture confectionery products such as biscuits, sweets, beverages, and dairy products in the downstream sector.

According to the export data from ITC, beverages, oilcake, cereals, vegetables, meat, and dairy produce are also major export foods. Particularly, the export of oilcake, which is a sub-category of "Residuals and waste for food industries-HS 23) increased from US$75 million in 2014 to US$84 million in 2018 because of Zambia's rising soya bean production. Exports of oilcake and soya bean products grew from US$22 million in 2014 to US$68 million in 2018, with an annual

growth in value of 40% in the same period. Zimbabwe, South Africa, Kenya, and Tanzania were the top four export destinations. There is growing demand for oilcake and soya beans products regionally and globally due to their nutritive value (high protein content) and relevance in adjacent value chains, such as the poultry industry. Data from the ITC trade map confirms that the SADC region had a trade deficit of US$236.9 million after importing soya oilcake worth US$25.6 million in 2016. Markowitz (2018: 8), reports that, between 2007 and 2016, South Africa imported soya oilcake valued at US$279.4 million annually, on average.

Figure 12 Soya bean Oilcake Trade Balance, 2012-2016



Source: Markowitz (2018: 28)

The cereal industry remains an important agro-value chain despite recording a decline in value by 16% between 2014 and 2018. Zambia produces maize, which surrounding countries, such as the DRC, depend on. As shown in table 6 above, the variability in cereal exports reflects the regular export bans on maize imposed to ensure domestic food security in Zambia. However, some critics have pointed out that export restrictions are detrimental to the market and there is a need to reconsider them in the interest of deepening regional integration (Chapoto et al., 2018).

Zambia needs to identify food value chains with the potential for upgrading and capabilities development to promote diversification and trade. The following section presents some of the

value-chains with such potential using the trade data above. Identifying key value-chains is necessary considering the urbanization, income growth, and deepening regional markets in Zambia, as well as the recently established African Continental Free Trade Area.

4.4.3 Potential agro-processing value chains to explore for industrialization

Zambia has a viable food industry, which has grown in recent years, putting pressure on processors to meet increasing food demands. However, expanding domestic demand does not necessarily mean that it should be met by local production. Instead, Zambia's potential, especially regarding industrialization in the current era of globalization, will only be achieved by exploiting some products where Zambia has a comparative advantage. Zambia's agricultural potential is enormous, and the potential to industrialize through agro-food processing is encouraging if challenges and opportunities facing the value-chains industry are addressed.

Over the years, the food industry has recorded significant growth, as reported by the World Bank (2014). As illustrated in the previous section, trade data reveals important food value-chains that are particularly interesting for the agro-food industry. They could harness the potential to industrialize Zambia's economy. The following are the agro-food value chains that show promise for further upgrading and capabilities development, based on production and export potential:

- *The sugars and sugar confectionery value-chain*
- *Cereals*
- *The soya bean value chain*

The sugar industry makes a major contribution to Zambia's industrial growth and development. Zambia is a net exporter of sugar and offers the lowest production costs in the region (Ellis, Singh & Musonda, 2010). Production and export are largely controlled by one company, South Africa's Illovo Sugar Group.[17] The country is well placed to exploit the opportunities related to access to low-cost sugar. It could develop value-added products of a low-to-medium sophistication in the sugar and confectionery value-chains (das Nair, Nkhonjera & Ziba, 2017).

[17] South Africa's Illovo Sugar Group is wholly owned subsidiary of Associated British Foods (ABF) Plc, a British multinational company.

Nevertheless, Zambia is faced with two issues: lack of competition and high input costs present serious difficulty for the value chain. The country imports almost no sugar because of vitamin A fortification legislation, which serves as a non-tariff barrier (NTB), protecting the domestic industry. Zambia Sugar's market dominance and the lack of threat from sugar imports mean that Zambian sugar prices are higher than regional sugar prices. Zambia's confectionary industry – processing raw sugar into sweets, biscuits, cakes, and so on – relies on Zambian sugar because of sugar imports restrictions. This industry is also relatively concentrated, partly because Zambia Sugar's market dominance has meant that confectionary producers must have the power to negotiate lower sugar prices to survive (das Nair and Nkhonjera, 2017). Zambia does export some confectionery products – primarily to Malawi and Zimbabwe (Phiri and Ziba, 2018). When high sugar prices are compounded with the costs of labelling and packaging standards, Zambian confectionery products are unable to compete with South African confectionery products in supermarkets, and so must rely on independent sales (Phiri & Ziba, 2018). This method is becoming less reliable and sustainable as the demand for supermarket products in African countries grows.

According to trade map data, Zambia also has enormous potential to become a leading producer and exporter of maize and soya beans in the region, despite encountering challenges associated with climate change and access to inputs and infrastructure. Although Zambia has production capabilities for maize, there are limited opportunities to develop a strong value-chain as most countries in the region are self-sufficient (Paremoer, 2018). Also, maize can only offer limited opportunities for downstream processing; most of it is processed as maize meal. Maize export bans in Zambia have also affected the development of the value-chain, which stakeholders have said is detrimental to the industry. There are also are weak links between maize and adjacent value-chains in the animal feed and poultry sectors (Fessehaie *et al*., 2015).

While maize remains an important crop in Zambia, attention has shifted towards the production of soya beans, which offers substantial opportunities and provides high-value

oilcake to support the growing poultry and livestock industry. Additionally, although not well-measured, there is increasing demand for soya bean products for human consumption, such as edible oil, milk, sausages, hotdogs, soya chunks, corn-soy blends, and other products. This study will look further at the soya beans value chain in detail demonstrate the upgrading and capabilities development of agro-food processing

5. EXPLORING THE POTENTIAL FOR UPGRADING AND CAPABILITIES DEVELOPMENT IN AGRO-FOOD PROCESSING: THE SOYA BEAN VALUE CHAIN

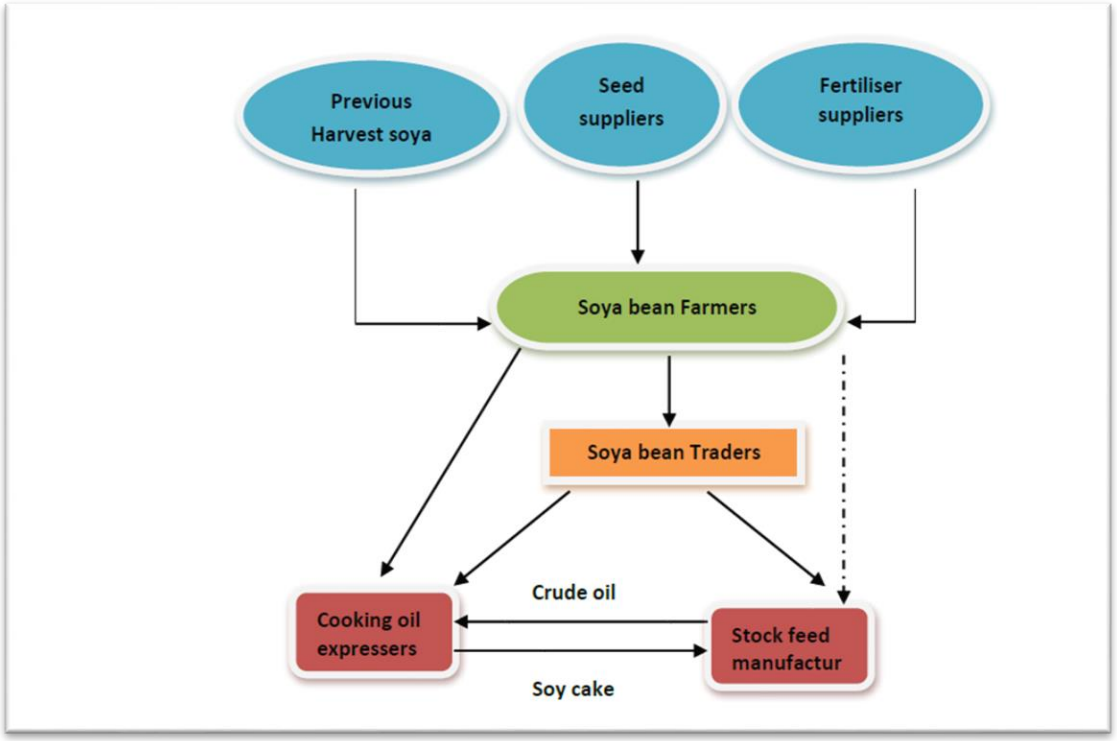
This section provides an overview of the soya bean value-chain and further explains what the value-chain entails in the context of structural transformation in Zambia. Primarily, the section identifies opportunities for growth both in the upstream and downstream sectors. It also investigates some major players, key constraints, and potential areas of policy intervention needed to improve the soya bean value chain's competitiveness.

The soya bean value-chain was chosen because of several developments that have taken place in the sector. Research confirms that the soya bean value-chain has important linkages to a wide variety of products with a high added value, such as soymilk, edible oil, and soya cake, because of innovation by agro-processors in recent years. There is also evidence of increasing exports of soya products to the regional market. Such a development is crucial for the downstream production sector: the export of soy cake to the livestock and poultry industries.

5.1 Mapping the value chain

The soya bean value-chain is presented in Figure 11. Broadly, three critical stages can be identified: the input market, the production stage, and the marketing/processing stage. Though not included in the schematic illustration, there are also other important processes that take place in the soya bean value-chain; these include aggregation, wholesaling, retailing, and consumption.

Figure 13 Illustration of the Soya Bean Value-Chain for Zambia



Source: CUTS International Zambia (2016: 14)

The processing firms purchase soya beans from farmers in two main ways: direct purchase (some through contract farming arrangements) and indirect means through aggregators or traders who purchase from farmers and then resell to the agro-processors. Thereafter, processors extract the oil from the beans and soy oilcake, a by-product which is an essential input in the livestock and poultry industries, is produced.

5.2 Market Structure and Key Players

It is estimated that commercial farmers produce about 75% to 95% of the total soya bean production in Zambia (Imakando, 2017: 14). These commercial farmers mainly come from the Central, Eastern, Lusaka, Copperbelt, Southern, and Northern provinces. Crop forecast survey data from Zambia's central statistics office show an upswing of soya bean production from 214,179 metric tons (MT) in 2014 to 351,416 MT in 2017 before slumping the following year due to poor weather conditions and crop diseases (CSO, 2018; Chapoto *et al.,* 2018). According

to interviews with large processing firms and trade data from ITC, the rise in soya bean production, which is mainly commercial, was driven by the expansion in demand for soya oilcake from the domestic poultry industry, the growth in human consumption of soya products, and export growth in the regional markets, such as Zimbabwe. Chisanga and Chapoto (2018), as well as primary data sources from the Ministry of Agriculture, suggest a shift from maize cultivation to other cash crops, including soya beans, as a result of export restrictions on maize (Kuteya & Samboko (2018) and limited trade opportunities, as most surrounding countries are considered self-sufficient in maize (Paremoer, 2018).

As illustrated in section 5.4 below, structural transformation can be made possible through soya bean value chain because it offers substantial industrial linkages with other value chains, thereby forming the basis to harness value-addition and export-led growth. Soya beans is an attractive input in the poultry and livestock industry, the manufacture of edible oil, products for human consumption such as sausages, as well as the potential to develop industrial products, for example, biodiesel, paints, adhesive, and disinfectants.

The increase in small-scale farmers' participation in the sector gives impetus to promote job creation, income generation and rural industrialisation. In the 2016/2017 agricultural season, the country produced 351,416 MT of soya beans. Of this total output, small-scale farmers accounted for 42% of soya bean production compared to 32% in the 2015/2016 season (Chapoto *et al.,* 2017: 40). One key surprise in the production of soya beans in Zambia is how rapidly small and medium-sized farmers responded to market incentives. It shows the flexibility in supply can be harnessed. Attention needs to be given to small-medium farmers to grow them into commercial producers and foster dynamic competition.

Table 7 List of Leading Firms Processing Soya Beans and their Products

Name of Processor	Soya Beans Based Product
Mount Meru	Refined cooking oil and oilcake
Unified Chemicals	Refined cooking oil
Trade Kings	Soya chicken fillets, Soy powdered milk, and Nyama soya chunks
Parrogate	Refined cooking oil and soy oilcake
National Milling	Cooking oil and Livestock
COMACO	Soymilk, soy cake and soy chunks
Seba Foods	Soya chunks and other texturized vegetable protein products
Gourock International	Soap and refined cooking oil
Novatek	Livestock feed
Tiger Feeds	Livestock feed
Namfeed	Livestock feed
Essential Commodities Limited	Soya chunks, High Energy Protein porridge, refined cooking oil
Java Foods	Corn soy blends

Sources: Interviews (July-August 2019) and Hichaambwa *et al.* (2014)

The major primary processors of soya beans are listed in Table 7. Large companies with heavy-duty processing machinery mainly undertake the processing of soya beans. Commercial processors use either the solvent extraction method or the extrusion method, which allows them to produce refined cooking oil and crude oil, respectively. Most of these processors have vertically integrated operations, and produce most of the soya beans they process,[18] but they also purchase from other producers. There has been a significant increase in the number of small-scale soya bean processors, for instance Java Foods, which produces innovative products such as corn-soy blends (CSB) catering both for formal and informal markets. Interviews with informants such as the Zambia Chamber of Small and Medium Business Association (ZCSMBA), Technoserve, Private Enterprise (PEP) Zambia, and independent industry experts in Lusaka suggest increasing knowledge in the basic processing of soya beans. These processors produce a variety of products such as porridge, chunks, flour, snacks and so on.

The study recognizes that the lack of competitive soya bean market structure (production and marketing) prevents significant exports. The linkages that occur still often hinder small-scale

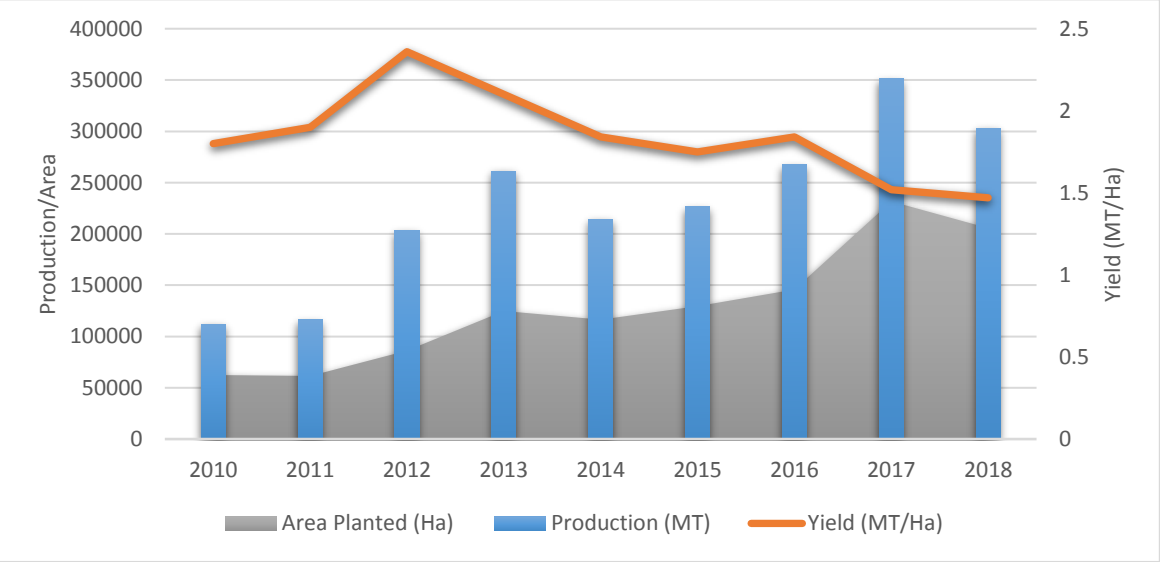
[18] For instance, Zambeef, the largest integrated agri-business firm, in 2017 produced 44,720 tons of soya beans via its irrigated row-cropping operations, producing about 60% of inputs required for its further value-added processing within the company.

farmers; whose profit margins are significantly low. Therefore, it is important to assess the production, industrial linkages, and other key issues and areas of capabilities development needed to increase the value chain's competitiveness to support industrialization.

5.3 Production of Soya Beans in Zambia

Although Zambia has plenty of land and massive bodies of water, most of it remains under-exploited. Zambia's agronomic conditions are well-suited to the production of soya beans. Regionally, the country has the potential to become a leading producer of the commodity, which could augur well for industrial development considering that soya beans are an attractive input in adjacent value-chains, such as oilseed for the animal feed and poultry value-chains, as well as products for human consumption like soymilk. Soya beans are a relatively new crop in Zambia, but in recent years soya bean is becoming one of the leading cash crops among farmers (ZNFU, 2017).

Figure 14 Soya Beans Production (tons), 2010-2018



Source: Author's compilation using Crop Forecast Survey Data, CSO Zambia.

Source: Retrieved from http://zambia.opendataforafrica.org/ZMCRFCSD2016/crop-forecast-survey-data-of-zambia-2015, July, 2019

Figure 15 shows that soya bean production between 2010 and 2018 has grown substantially, expanding more than fivefold from 111,887 MT in 2010 to 302,720 MT in 2018,[19] despite production declining from 351,416 MT in 2017 to 302,720 MT 2018, a reduction of 13.9%. As the figure suggests, the increase in soya beans over the period is mainly due to the expansion of area planted. While the area planted with soya beans grew from 116,515 Ha in 2014 to 205, 508 Ha in 2018, the yield has fallen from 1.84 MT/ha to 1.47 MT/Ha over the same period. The variability in yield is associated with the reaction by farmers to unstable market prices. For example, the 2016/2017 farming season registered low prices, and consequently, production output fell in the following season. Bad weather and arid conditions have also been cited as potential risks to the soya bean crop. Compounded by other factors, the reduction of soya bean production in the 2017/18 farming season led to major shortages in supply, negatively impacting the animal feed and edible oils sectors (Chapoto *et al.,* 2018).

5.4 Industrial Linkages of Soya Beans Value Chain with Other Value Chains

The soya bean value-chain has significant industrial linkages with other value-chains. These largely form the basis for strengthening the competitiveness of the value-chain to harness value-addition and industrialization in Zambia. Various products can be manufactured from soya beans (see figure 16 below).[20]

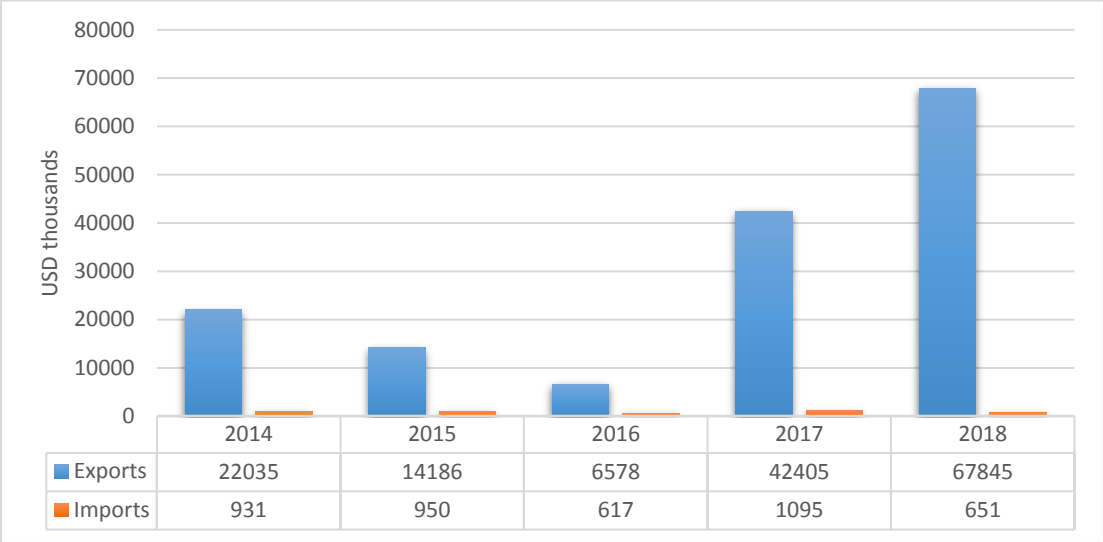
Soya beans are an attractive input in the poultry and livestock industries. Figure 16 shows the trade (exports) of soya cake with an upward trend, increasing from US$22 million in 2014 to US$67 million in 2018, at an annual growth rate in the value of 40% over the period. The top four leading importers of Zambia's oilcake are Zimbabwe (39.3%), South Africa (28.7%), Kenya (13.1%), and Tanzania (11%).

Zambia's increased soya beans production is mainly driven by firms enjoying substantial profit margins in the livestock and poultry industry (Samboko et al., 2017), buttressed by meat consumption in the domestic and regional markets (Paremoer, 2018). According to the

[19] In 2007, production of soya beans stood at 55,194 MT, a substantial growth to 302,720 MT in 2018.
[20] In Zambia, however, a large proportion of the soya beans processed are used to produce soya oilcake and edible oil, with human foods such as soya chunks, corn-soy blends, snacks, and soap becoming increasingly important.

Samboko *et al.* (2017) and interviews with large processing firms, soya-bean cake forms an important input in the livestock and poultry sectors because of its rich protein content compared to other sources such as sunflower and maize.

Figure 15 Trade in Soya Oilcake (HS Code 2304), 2014-2018



	2014	2015	2016	2017	2018
Exports	22035	14186	6578	42405	67845
Imports	931	950	617	1095	651

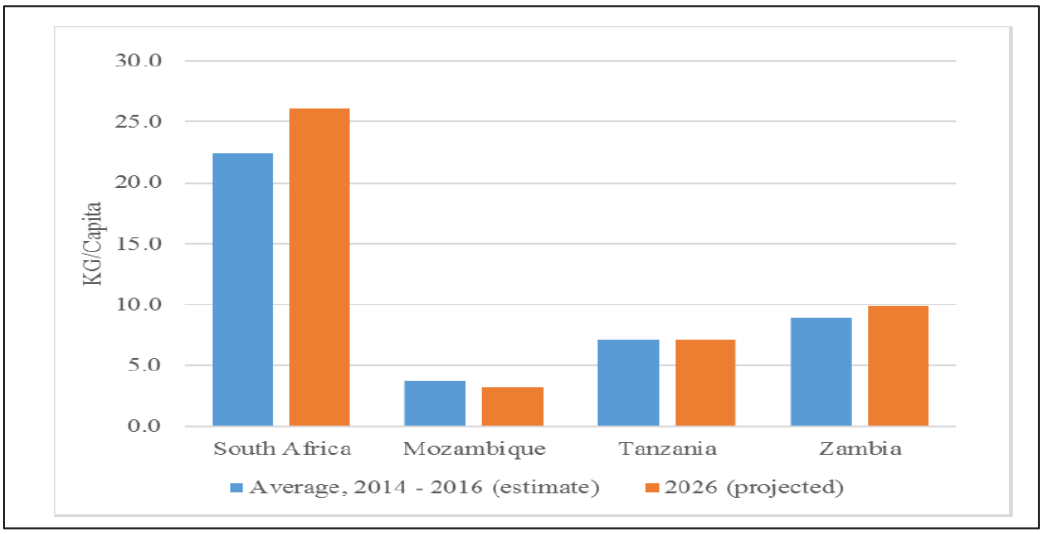
Source: Author's compilation from ITC Trademap data

Given the impressive growth of the animal feed and poultry industries in the southern region of Zambia in recent years as a result of rising per capita income, population growth, and urbanization, soya beans as a crop have become more accepted by the industry, the government, and development organizations such Technoserve and PEP Zambia. During this study, it became clear that the movement to develop a competitive soya bean value-chain is gaining traction.

However, studies by Samboko *et al.* (2017), Markowitz (2018), and stakeholder engagements with small and large processing firms in Lusaka suggest an insufficient supply of soya bean cake in the region is the key challenge to the animal feedstock and poultry industries. For instance, data from the ITC trade map confirms that the SADC region had a trade deficit of US$236.9 million after importing soya oilcake worth US$25.6 million in 2016. In other words, the southern region is a net importer of soya oilcake, with South American countries such as Argentina and Brazil being the main overseas sources for import.

Another large market for soya beans is the edible oil industry. Edible oil is produced alongside soya oilcake as a soya bean by-product. The region's trade deficit in soya beans is estimated to be around US$368.3million, with nearly all SADC countries facing a negative trade balance for the commodity (Markowitz, 2018: 8). The production of edible oil is a sensitive industry, as most countries have imposed tariffs to safeguard the sector. In 2017/2018, East African Community (EAC) member countries increased tariffs from 25% to 30%, with subsequent increases to 35% in 2018/2019 and to 40% in 2019/2020 (Tralac, 2017). Edible oil, particularly from vegetable oilseeds, is a sought-after commodity because of its health benefits. The edible oil deficits, and continued growth in demand arising from population increase, implies that Zambia (figure 17) has the potential to market demands, including the regional markets. However, protectionist policies in EAC demonstrates lack of coordination in addressing a regional deficit in favor of "short-term protection based on narrower national trends" (Paremoer, 2017: 38). Going forward, developing a regional industrialization strategy that aims at strengthening linkages between countries in the region instead of narrow polices that a "winner takes all" approach can support growth, value-addition, and competitiveness in the soya bean value chain.

Figure 16 Projected per capita consumption of vegetable oil (for human consumption only)



Source: Paremoer (2018; 38), OECD Vegetable Oil Projections

Zambia already has more than enough installed capacity to process soya beans. Currently, the country has enough installed capacity to crush approximately 400,000 MT of oilseeds per annum but only manages to crush about 150,000 MT per annum (Imakando, 2017: 10). Information from field visits and primary sources confirms that the country has a deficit of about 60% to 70% in edible oils, which is currently being met by imports from South Africa and East Asia. The national demand for edible oils is estimated to be around 120,000 tons per annum (Hichaambwa *et al.,* 2014: 37). Soya bean processors in Lusaka complained of the smuggling of cheap edible oil into the country, negatively affecting local production. Additionally, interviews with a Ministry of Commerce, Trade and Industry (MCTI) official and processing firms indicated that imports could undermine efforts to create job opportunities in the domestic economy. The Zambia Chamber of Commerce and several processing firms have called for the regulation of the importation of edible oils in order to incentivize local processors.

BOX 1: CHALLENGES IN THE EDIBLE OIL INDUSTRY IN ZAMBIA

Despite the increasing demand for an edible oil value-chain, many factors have inhibited it from thriving as much as the feed industry has. As well as constraints, such as the quality of raw materials (soya beans and oilseeds), and the competition from soya oilcake, the edible oil industry is also faced with trade and regulatory challenges. In Zambia, small-scale and domestic processing firms still encounter significant competition from imported palm oil, which usually is sold at lower prices. However, it is regarded as less healthy than seed-based oils. Despite increasing consumer demand for healthier oils, local processors cannot compete with cheaper imported high-quality oils from South Africa and other countries. Under the SADC and COMESA trade agreements, these imports enjoy duty-free status.

Value-added tax (VAT) is another significant challenge in the edible oil industry. Processors interviewed argue that VAT must be removed in order to incentivise local production. The government, on the other hand, supports VAT as it is a reliable source of income to the fiscus.[21]

Corruption was considered a major bottleneck inhibiting the growth of the soya bean sector. It is reported that refined edible oil is mislabeled as crude oil and then imported into Zambia. In other cases, tanks of refined oil would enter the southern border en route to countries to the north of Zambia, but remain in the country, despite indicating that they have exited the northern border. These actions could undermine the profitability of locally based edible oil refineries. Cargill is an agro-processor that has shut down its oilseed refinery in October 2018, citing illegal imports of oil into the country as the cause; the

[21] Investors in agro-processing express concerns about the VAT issue in Zambia https://www.aatif.lu/news-detail/the-africa-agriculture-and-trade-investment-fund-aatif-invests-usd-5m-in-mount-meru-millers-zambia-a-leading-edible-oil-producer.html

shutdown made 260 people jobless.[22] The oil that is not taxed correctly also is a problem for the government.

These issues explain why soya beans are not usually used for oil production rather than soya oilcake. This reduces the competitiveness of the value chain. An immediate need is for the government to regulate the importation of cheap oil in order to stimulate local production. Also, allegations of corruption should be followed by decisive actions, tight border inspections, and post-market surveillance.

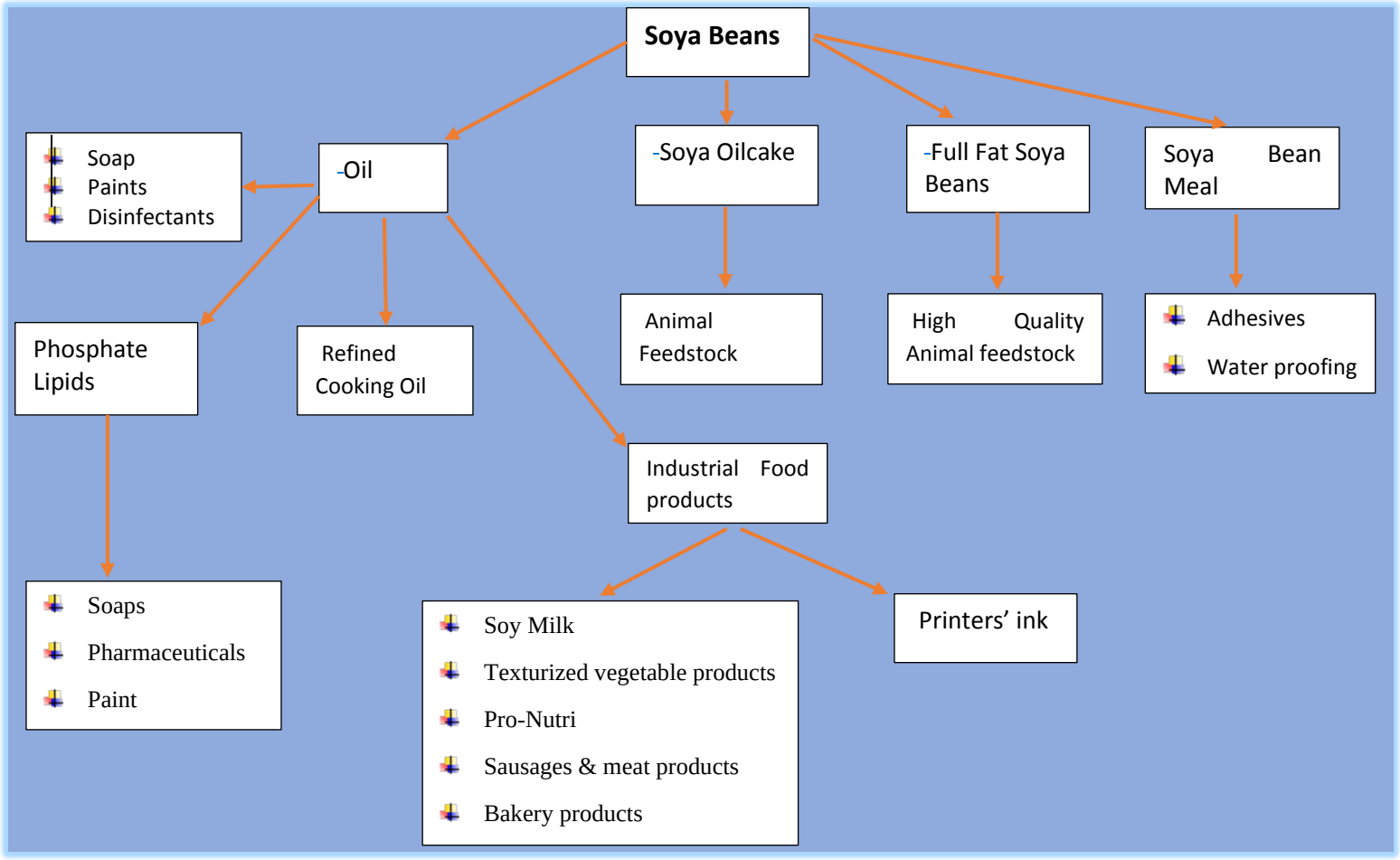
Sources: Secondary sources, *interviews with processing firms, and a private sector association.*

As is the case in other countries, in Zambia soya beans are also used in human foods, though the off-take proportion is less than in the oilcake or edible oil industries; people are still weighing the profitability of alternative uses. For instance, primary sources suggested Zambia does not yet have the potential to develop products such as biodiesel, paints, adhesives, disinfectants, and cosmetics, but that feasibility studies are underway. For this study purpose, the focus is on primary products such as soya oilcake, edible oils, and products such as soya chunks and soymilk as they represent the most significant agro-processing activities.

Developmentally, interviews suggest that strengthening the soya bean value-chain offers a significant opportunity for smallholder farmers because it is relatively easy to grow. The crop does not require very sophisticated inputs, it is an excellent alternative crop to maize in a maize-centric economy such as Zambia, grows well in the current climatic conditions, and is a cash crop for small farmers.

[22] https://diggers.news/business/2018/10/31/cargill-shuts-lusaka-oilseed-refinery-260-jobs-lost/

Figure 17 Summary of Soya Beans Industrial Linkages with Other Value Chains



Source: *Author's compilation from interviews and secondary sources*

Despite the industrial linkages between soya beans and adjacent value chains, the soya bean value chain is not without challenges. The following section draws attention to the key issues of the soya bean value chain, and areas where intervention is needed to strengthen it, especially if the crop is to be used to encourage industrialization.

5.5 Developing a Competitive Soya Bean Value-Chain: analysis of key issues in the soya bean value-chain.

Developing a competitive soya bean value-chain is the key to unlocking industrial development in Zambia. It is evident that there are enormous opportunities connected with the unmet demand for soya products in key industries such as poultry and livestock, and edible oil. However, the soya bean value-chain faces major problems, which affect production, processing,

and marketing opportunities. Broadly speaking, the major challenge affecting the value-chain is competitiveness. Therefore, this section outlines relevant key issues and important areas of policy needed to develop a competitive soya bean value-chain that will support industrialization. However, it should be noted that the section is limited to key areas and does not examine the entire soya bean value-chain.

5.5.1 Production Capabilities and Securing Quality Inputs

One of the key considerations that determine the agro-industry growth and competitiveness is its link to competitive production capabilities enabling the security of quality raw materials. The decision to invest in soya beans' industrial processing largely depends on the ability to secure quality raw soya beans. One cannot fully appreciate the development of the agro-industry without improving the first steps of the value chain, that is, discussing the supply input stage.

Key inputs in soya bean production are the supply of seed, fertilizer, lime, and agro-chemicals such as inoculant and herbicides. These inputs constitute the major total production costs that local farmers in Zambia incur. Interviews with an official from Ministry of Agriculture, reports by CUTS (2016), and Chapoto *et al.* (2018) all suggest that securing quality seed for soya beans is still ranked as one of the major challenges, particularly among smallholder farmers who are mostly forced to recycle to minimize the purchase of new seed. Despite significant declines in yields, there have been some general positive trends in the use of improved seed varieties in rural areas, rising to a 62% increment in 2018 compared to 55% in 2003 (Chapoto *et al.*, 2018: 18). The availability of a wider variety of seed is felt to be the result of Zambia allowing many more efficient operators to participate in this sector.[23] There are currently about five suppliers of seed in Zambia: Zambia Agricultural Research Institute (ZARI), Pannar, Seedco, MRI, and ZamSeed. Nonetheless, these companies seem to control the greater proportion of the market and could exert monopoly power over the market.[24]

Interviews with industry players in Lusaka indicated that local seed companies have some of the best seed varieties in the sub-region. Despite the existence of basic infrastructure, there are

[23] Interview with agricultural expert from the Ministry of Agriculture, 6th August 2019
[24] This is particularly due to intellectual property protection on cultivars

plenty of opportunities yet to be explored, particularly in research and the development of seed varieties intending to increase yield.

In addition to securing seed, farmers also can find it challenging to procure fertilizer. Despite the general upward trend of farmers using fertilizer, most of it is used for maize farming. Use of fertilizer by households increased from 32% in 2003 to 59.9% in 2017 (Chapoto *et al.,* 2018: 15). Imports usually meet the supply of fertilizer as Zambia currently does not manufacture fertilizer domestically. Ncube, Roberts & Vilakazi (2015) also noted that the cost of fertilizer in Zambia is influenced by cartel behaviour[25] and the cost of road freight, albeit becoming competitive in recent years. The study further noted high concentration of firms at the upstream level, mostly large MNC's that hold significant market power, resulting in high cost of fertilizer. Currently, the country relies on suppliers such as Greenbelt Ltd, Pro-Vet, Omnia, Nitrogen Chemicals of Zambia, and Nyiombo Investments. This, therefore, provides an investment opportunity.

Chemicals are also an important input requirement in the production of soya beans, and interviews in Lusaka suggest that small-scale farmers still find it difficult to access them. ATS Agrochemicals, Agrifocus, Cropserve Ltd, and Amiran Ltd are the leading agro-companies that supply chemicals. Inoculant, a critical input which encourages the formation of high-nitrogen nodules for greater soil enrichment, making the plant bigger and providing higher yields, is said to be produced, however, only by Zambia Agricultural Research Institute (ZARI). ZARI is faced with the problem of having insufficient capacity to supply the chemical to all the farmers wanting it, mainly because the government underfunds the institute.

5.5.2 Irrigation and Other Supporting Infrastructure

Zambia's agricultural system mainly depends on rain-fed farming. Although commercial farmers in Zambia are highly mechanized and have invested heavily in irrigation infrastructure to support cropping activities during outside the rainy season or when there are droughts, smallholder producers still lack these facilities needed to improve their productivity levels. *"You must understand that Zambia depends on rain-fed agriculture; as much as we (agro-processing firm) have invested in irrigation, most of our suppliers (smallholder farmers) are still relying on*

[25] According to Ncube, Roberts & Vilakazi (2015), Zambia has only prosecuted cartel conduct between Omnia and Nyiombo.

the rains to grow the crops. In years when we have droughts, we get affected [SIC]," a large processing firm noted with concern.

About the transport, Zambia is a land-locked country, and that means the economy depends on overland transport to import commodities such as oil from suppliers overseas. Whilst government has generally improved roads in the country, physical access to markets, together with connectivity, transport, and energy (fuel and electricity) requirements further constrain rural farmers' ability to increase the crop production and distribution to urban markets. Improving infrastructure will inevitably create more linkages between producers, aggregators, processors, and end markets along the entire value chain.

5.4.3 Weak Extension Services

Although the government, through both the Ministry of Agriculture and Cooperatives, provides extension services to farmers, there seem to be weak support services for smallholder farmers. Further, it became evident during the study that there is currently no specific public project that looks exclusively at soya bean production. Low investment (i.e. extension services) in agriculture is said to be among the biggest challenges that the agro-industry faces in Zambia (Chapoto *et al.,* 2018). Strengthening the soya bean value-chain will require providing appropriate and affordable agro-technologies as well as heavy investment in extension officers to teach farmers how to improve their production efficiency and maintain good farming practices.[26]

5.4.4 Investment in storage and aggregation facilities

Investment in storage and bulking centres is important for strengthening the soya bean value chain. Storage facilities not only help farmers to sell their crops at the most profitable point, but they also help to increase the value of the crop to processors as they will be able to obtain soya beans with the right moisture content for processing. If soya bean does not have the right moisture content, it leads to losses by both the farmers and the agro-processors.[27]

[26] Interview with a large processing company, 3rd September 2019
[27] Interview with a large processing company, 5th September 2019

Linked to storage is the setting up of aggregation centres. An informant from PEP Zambia interviewed in Lusaka explained the organization's efforts to strengthen the soya bean value chain. "*...Another part we have invested in is aggregation. We have helped the Kasama processors to set up eight aggregation centres where the seed is stored, weighed, and even graded. After the aggregation is done, we have also invested in his machinery, which increases the processing capacity. So, what we have done is finding ways to stimulate each area in the soya bean value-chain [SIC],*" an informant explained. Targeting key points where there are significant gaps in the value-chain is crucial to unlocking the industry's potential. But such efforts will require the private sector to invest more and government to provide an enabling environment and key infrastructure.

5.4.5 Investment in Handling/Grading of Soya Beans

In many agro-processing value chains, investments to improve the process of handling and grading products significantly add value to the product. In studies done by Chisanga & Sitko (2013), Lubungu *et al.* (2013), and Chisoro *et al.* (2017) focusing on agro-processors of oilseeds, reveal that securing clean, well-sorted, and graded seed not only adds value but also increases the competitiveness of the products in the export market.

Interviews with some processors in Lusaka indicated the urgent need to invest in globally recognized grading systems to allow soya bean processors to determine the commodity's value and improve trade in the market. Investing in handling and grading systems could play a significant role in developing a commodity exchange and forecasting future prices.

5.4.6 The Development of a Commodity Exchange and Information Management System

Both secondary data and interviews reveal that developing a competitive soya bean value-chain is inhibited by poor linkages to market access and the unreliability of market information, especially among smallholder farmers. Better access to reliable markets and information could assist farmers in planning better and finding the best market opportunities for their products while addressing unfair trading behaviors on the part of private buyers and aggregators.[28] It

[28] Interview with an industry expert from the Zambia Chamber of Commerce, 30 August 2019

could also minimize government interference in the market (usually in the form of export bans) made to ensure food security (Markowitz, 2018).

To address marketing challenges, Zambia created a well-functioning platform called the Zambia Agricultural Commodities Exchange (ZAMACE) with established warehouse certification systems to improve market access, finance, and credibility in the agricultural commodities market. This enhances producers' liquidity, as local commercial banks now accept generated receipt systems as collateral from farmers and agro-industries, allowing them to access finance (Paremoer, 2018).

Apart from providing a platform for trading and the issuance of warehouse receipts that conform to global industry standards, ZAMACE has also been trading future prices for soya beans, maize, and wheat on the Johannesburg Stock Exchange (JSE) since May 2017. This development has provided a structured commodity trading platform and credit system, which was slow to become a reality. However, smallholder farms seem still to be experiencing difficulties in obtaining accurate market information. There is a need to mainstream and improve information management systems and connectivity to include more players, such as smallholder farmers, to develop a competitive soya bean value-chain in Zambia.

6. BUILDING CAPABILITIES FOR AGRO-FOOD PROCESSING FIRMS: ANALYSIS OF CONSTRAINTS AND OPPORTUNITIES FACED BY AGRO-PROCESSING FIRMS IN ZAMBIA

Food processing companies are the backbone of and driver to the agro-food industry in Zambia. To minimize post-harvest losses and stimulate value-addition, agro-processing firms have an important function to turn agricultural raw commodities into high-value consumable products. However, processors face several hurdles. Therefore, it is necessary to investigate the key challenges and opportunities the agro-processors face in developing capabilities for enhanced value-addition and linkage development.

6.1 Meeting market standards and certification schemes

A major constraint for Zambia's agro-food processors, particularly those using simple technologies, is how to meet and maintain standards, together with the process of incorporating certification systems to fulfill domestic, regional, and international food safety requirements. Regional and international standards have a special entry requirement for those wishing to enter the export markets. Stakeholder engagements with the Zambia Bureau of Standards (ZABS), Technoserve, PEP Zambia and the Chamber of Commerce, however, suggest significant gaps in the knowledge of basic principles, for instance, good manufacturing practices (GMP), the Hazard Analysis Critical Control Point (HACCP),[29] and their implementation and availability in the country, needed to make the process more accessible and cost-friendly for small and medium-sized agro-processors.

Some interviewed firms operating in Lusaka indicated that they are certified by the Zambia Bureau of Standards (ZABS)[30] and internationally have ISO 9001 of 2015 and HACCP. However, they expressed concerns about the tedious stringency and level of detail of the instructions which these certifications require processors to meet. One large company processing edible oil

[29] HACCP is a preventative management system to ensure food safety from chemical, physical, and biological hazards in production processes that can cause the final products to be unsafe and to design measures to minimize these to a safe level.
https://safefoodalliance.com/food-safety-resources/haccp-overview/

[30] ZABS is a statutory body charged with providing standardization and conformity assessment services in Zambia.

and soya cake from soya beans recounted the hurdles they went through to get these food safety management systems in place.

> *"We had several challenges to formalize HACCP and ISO 9001. We charted new waters, and these certifications were not easily understood. The challenges we faced were: one, we did not have technical understanding of the system but later through training we were able to develop and implement these systems. Second, literacy levels for some operators we have are low. You are talking about an operator who is not well-educated, and you bring in systems he/she does not fully understand. So, as a company, we are forced to tailor-make these systems to suit this person. That is not easy at all [SIC]."*

In an independent interview, industry experts from Technoserve and PEP Zambia indicated that the process of setting up systems and product standards is even more difficult for small-scale processors. Although information revealed through stakeholder engagements suggests that some companies are meeting specific market standards and certification requirements, the number of food processing companies that are certified to national and international safety standards, such as FCSSC 22000, ISO 22000, ISO 9001:2015, Global gap, and BRC standards are few.

When we asked why most food companies in Zambia struggled to meet food and market standards, especially international requirements, one interviewee from ZABS remarked,

"*These companies lack the technical knowledge required to implement these schemes. So, in other words, the technical knowledge on the requirements of the standards and how to implement them in their own settings, they normally lack anybody who has got sufficient education or training to implement these systems. So you will find that they lack technical skills and that also interacts with the financial ability; hence they cannot undergo training, get advisory services, or even afford consultancy….maybe also the standards themselves are very stringent such that it becomes very expensive to operate under the current conditions [SIC]*."[31]

Addressing some of these gaps in food safety will require both state and non-state actors to establish strategic partnerships with agro-processing firms by providing technical expertise to enable the agro-industry to produce quality goods and services. Nationally, this is the mandate

[31] Interview with ZABS official on 28th August 2019

of ZABS, and it has so far certified over 34 products, ranging from food and beverages to cement, electrical components.[32] In the soya bean value-chain, "*We do have several soya bean companies that produce edible oil, porridges, soy blends, soy chunks, soy drinks, animal feed, and we do have standards for all these products. For example, we have standards for soy meat (called texturized vegetable products) and soy-maize blends. However, the first gap is that we do not have all the standards for the entire soya bean value–chain [SIC],*" a ZABS official remarked.

So far, about eight agro-processing companies have been certified, such as COMACO, a budding SME which is steadily growing to expand its domestic and international market share after successfully implementing food safety management systems based on HACCP and ZABS ZS 034.[33] Promoting quality and certifying more firms with nationally and internationally accredited food-safety management systems will inevitably open doors for local processors in formal markets, including regional markets.

There are plenty of opportunities for local firms to participate in domestic and export markets. However, the food processors' adherence to standards is an absolute requirement to guarantee consistency in quality and competitiveness in their products and services. The small number of companies with such international certifications as HACCP is indicative of systematic exclusion from the regional and international markets where these certifications serves as a gateway to high-end export markets. Making these food-safety management systems more readily available and accessible to local processors presents an opportunity to boost their participation in agro-food value chains, especially in high-niche end markets.

On the other hand, although modern markets offer lucrative opportunities, some food processors interviewed in Lusaka indicated that they did not require international certifications because their target market is the local food industry, where demand is still unmet. This focus

[32] Interview with ZABS official, 28th August 2019
[33] Interview with ZABS official, 28th August 2019

of the local food industry; however, seems to mean that only firms wishing to penetrate the export markets have the incentive to incorporate international food-management systems.

Another concern expressed by firms and industry experts is that some regional and international standards conflict with the national standards set by ZABS. This creates difficulties for both ZABS and food processors. ZABS has, however, been working on harmonizing standards and, so far, 57 standards have been harmonized within the SADC region across various products, including some soya products such as soy oilcake.[34] This development has encouraged the Zambian processing industry to venture into the export business given some products' mutual recognition across the region.[35]

Apart from that, some small- and medium-scale firms indicated that they faced obstacles in acquiring certifications such as ISO 9001 because their factory's infrastructure is not compliant with these schemes. They are operating from brown-field structures, which they need to refurbish and align with the requirements set out in the certifications. This will require finance, which is another constraint for the firms. However, improving infrastructure would certainly increase their chances of securing certifications which would enhance their competitiveness. Firms will require both technical and financial capabilities to upgrade successfully.

However, interviews emphasized that encouraging systematic engagement between food manufacturers and the government – what could be thought of as the missing link – can accelerate the process of building capabilities in the agro-industry.[36] Creating systematic relationships between the government and the private sector, different players can unlock, for instance, product and skills development.[37]

[34] Interview with ZABS official, 28th August 2019
[35] Interview with an industry expert from the Zambia Chamber of Commerce and Zambia Association of Manufacturers (ZAM), 30th August 2019
[36] Interview with large processing company, 3rd September 2019
[37] Interview with a consultant from the Private Enterprise Programme (PEP) Zambia, 22nd August 2019

In addressing some of these critical challenges, the Private Enterprise Programme (PEP) Zambia and Technoserve have been working actively with selected food processors to expand productivity and efficiency along the soya bean value-chain. The programmes have further helped selected firms acquire international recognition based on HACCP implementation in their food-management systems. For details, see box 2 and 3 in section 8 below.

6.2 Technical Skills

A lack of technical skills is another critical barrier that agro-food processors in Zambia encounter. Requirements for technical skills vary from one firm to another, but the most frequently sought-after skills relate to food safety, food processing specialist, mechanical engineering, and chemical engineering. According to food processors and industry experts from ZDA, the Chamber of Commerce, ZAM, and PEP Zambia, the agro-industry requires technical skills to implement food safety management systems to increase compliance with food standards. As compliance with ISO and HACCP becomes increasingly important in local,[38] regional, and international markets, Zambia is expected to have a greater demand for skilled staff to run food safety management systems.[39]

Interviews with firms and industry experts, such as Technoserve and ZAM reveal difficulties finding competent people to install and set up modern machinery in factories. Consequently, firms are often forced to depend on skills from the companies from which they have bought the equipment or rely on the basic knowledge that they are given by the suppliers and installers of processing machines. "*So even when we have major breakdowns, we are forced to go back to the original equipment manufacturer. These are the areas we really face challenges. Again, technical support we are so behind in Zambia. We lack the skills needed [SIC],"* lamented one representative of a large processing firm. In a separate interview, an industry expert from PEP Zambia confirmed this experience. "*We have processors who ordered machines from the UK, India, China, and South Africa but when these machines reach here, there are no competent*

[38] For instance, supermarkets such as Shoprite and Pick n Pay now demand that local suppliers have their products certified with HACCP. This systematic exclusion has the potential to limit local agro-processors from accessing formal markets.

[39] Interview with an expert from the Zambia Chamber of Commerce, 30th August 2019

people to operate them. What happens is that they order the machines from India and the people who are going to install the machines come from that country. But what happens when those people go back and then there is a break down? So, we don't have the right skills to install, repair and probably operate these machines [SIC]," he explained.

Although some informants did not see a shortage of technical skills as a major bottleneck for the food industry, it remains an immediate problem for small-scale processors who cannot afford to hire highly qualified staff. In fact, most small firms can hardly put up bankable business proposals that could help them to acquire funding from development finance institutions.[40] Help from advisory services and engineering experts might be available locally but the cost of hiring experts and maintaining technical services is quite high.[41] This is a hindrance to agro-processing firms' that wish to commercialize and move into high-end niche markets.

However, views from experts, including the ZDA and the Chamber of Commerce indicate that Zambia has a labour force that is willing to work, which if well trained and managed, could significantly support the development of the agro-processing industry.

To address constraints related to the skills deficit in the food industry, government, have been offering technical and advisory support services through TEVETA institutions, Zambia Development Agency and ZABS, business associations like the Zambia Chamber of Commerce (ZACCI), Technoserve, Private Enterprise Programme Zambia (PEPZ), and others, in order to address the immediate demands in the manufacturing and agro-processing industry.[42]

Additionally, there is currently a Kaizen programme running under the Zambia Development Agency (ZDA) auspices with help from the Japan International Cooperation Agency (JICA). The program offers free technical advice on the Kaizen management method. One of the program interventions is product development and market linkages for SMEs, including agro-processors.

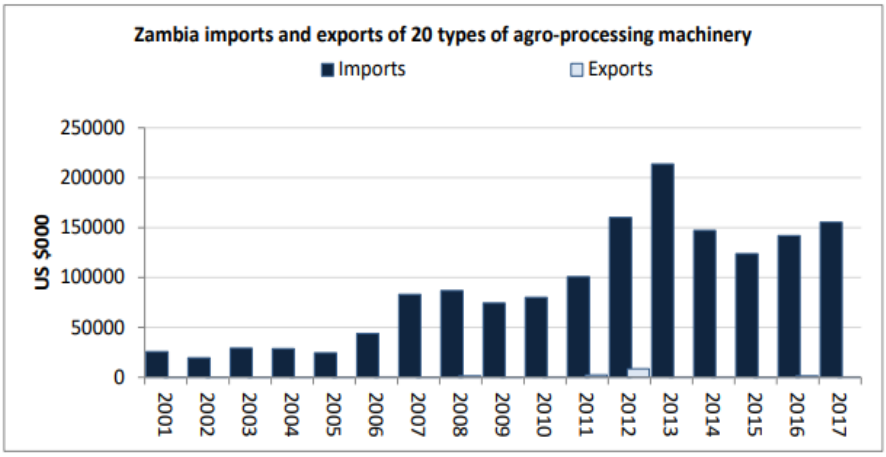
[40] Interview with an expert from the Zambia Chamber of Commerce, 30th August 2019
[41] Interview with Zambia Association of Manufacturers, 4th September 2019
[42] Interview with the Zambia Chamber of Small and Medium Business Association (ZCSMBA), 11th September 2019

These initiatives need to be part of a continuous process, which should allow new concepts and techniques to be introduced to improve the agro-processors' industrial capabilities and other actors along the entire soya bean value-chain.

6.3 Processing Technologies

Despite efforts to invest in food processing equipment and machinery, a significant proportion of processing firms still operate with almost basic processing technologies, especially among small and medium processors.[43] For large processors, the situation is different. One large firm processing edible oil boasted of the state-of-art technology that it has after undergoing an upgrade. "*I think I can rate our company as one of the most highly tech-oriented companies in Zambia. Everything is automated, and we rarely go in the plant to adjust parameters," a* company official stated.

Figure 18 Zambia's Imports and Exports of Agro-processing Machinery, 2001-2017



Source: Chigumira (2019: 9)

Zambia is a net importer of agro-processing processing technologies (see Figure 20). The increase in such machinery imports is due to rising demand for grain and legume products and for stock feed stock for the poultry and livestock industries. The top imports of machinery include machinery for industrial preparations, milling grain, legume, cereal, and bakery machinery. Imports of machinery have, in the last decades, grown exponentially, peaks in 2013

[43] Interview with an expert from Musika Zambia, 20th August 2019

(US$213 million), and 2017 (US$155 million). Imports of agro-processing machinery strain Zambia's balance of payments as they represent leakages that are also exacerbated by currency volatilities.

Exports of agro-processing technologies remain negligible and are unlikely to change soon. However, on the supply side, the value of imports has important implications for soya beans agro-processors.

Evidence from industrial tours seems to suggest that some companies are upgrading from old technologies to new ones. As a result, production efficiency and product innovation in some companies have improved. One of the informants from a large processing company had this to say:

> *"Apart from soya beans, this company also processes cotton. Initially, we used to have two old expellers to crush the seed but now we have purchased new expellers, which have improved the quality of the oil and the cake. The two old ones, if not well monitored, you would find either the cake is burnt or the oil coming out is a bit dark than what would normally get. This is because we used to refine cotton and soya bean from one refinery. What we used to do is after refining soya beans; we would flush out the system and bring in cotton. But after upgrading our refinery with the technology, we only have to close the valve through an automated system to separate and allow the other line to come in. As a result, the work has become easier to refine and monitor the oil due to efficient automated machines [SIC]."*

For many small processors of soya beans, the reality is different as for the value-chains of other foods. The absence of modern technology and the high cost of procuring equipment remains a major barrier to scale and technical efficiency. These factors inhibit SMEs from commercialising their produce and leads them to exit the industry. For instance, one typical challenge highlighted during interviews is that SMEs processing soya beans without modern technologies have problems with dry steaming or extrusion, consequently leaving their products either burnt or otherwise inferior in quality.

Figure 19 processing machine; taken with permission from a field visit in Lusaka.

Although agro-processors depend on imports of machinery from Germany, China, India, USA, among others, there are two major local suppliers; SARO Agro-Industrial and CAMCO Equipment Zambia also supply imported machinery and often carry out repairs and maintenance. Other local manufacturers providing good low-cost machinery include the Technology Development and Advisory Unit (TDAU) at the University of Zambia, and other private individuals that make agro-machinery from local and imported accessories (see Figure 21). Technoserve and PEP Z have been co-investing in processors to assist them to acquire and install modern processing equipment.

6.4 Food Packaging

Packaging is important to the success of the food-processing sector. With increasing globalization and heightened competition from other countries, the packaging constraints for processors, especially among SMEs, have likewise enhanced. Appropriate packaging plays a key role in improving food quality and safety, thus minimizing food losses, while showing market conformity, conveying value, and improving the agro-processors' competitiveness.[44] Additionally, packaging of processed food products offers a better way to differentiate similar products and improve small and medium-sized processors' competitiveness.[45]

Zambia has a packaging industry that supports the agro-processing sector, despite being in its infancy stage. Informants revealed that the food industry experiences serious difficulties related to a shortage of, and cost of, packaging and labeling advisory services, with designing

[44] Interview with an expert from ZABS, 28th August 2019
[45] interview with an expert from PEP Zambia, 22nd August 2019

and testing packaging, and a lack of information about where to source packaging materials. These problems are more pronounced for small and medium-sized processors, who, in aggregate terms, constitute the bulk of food manufacturers in Zambia. If unresolved, these constraints will hinder the development of the food processing industry.

Furthermore, food processors complained of stiff competition from imported processed and packaged products, especially those from South Africa. "*Believe you me; look at the products coming from South Africa, even mere cooking oil attracts you. This shows we (Zambia) have not invested on how package our attractively package our products and this, however, hinders us from being competitive in the export market. The international markets are very specific. But if the government, together with agro-processors, can improve the packaging industry, Zambia's products can compete favourably with peer countries. In turn, our local firms would survive competition when they export our products. For example, if you go to Kenya, there are standards for soya bean oil cake regarding the required moisture content, including the bagging itself; they will give you specifications on how it should be done. That is when your products can be allowed to enter Kenya. But in Zambia, it seems we get anything that comes [SIC],"* remarked an informant from a large processing firm.

Observations from interviews with firms and organizations like Technoserve seem to suggest that Zambia agro-food processors incur high costs for low standards of packaging materials compared to their counterparts in other countries such as South Africa. Recognizing this disparity, some firms have opted to source their packaging materials from other countries, for example South Africa, India, and China. These countries seem to offer better quality and relatively cheaper packaging material than what firms could source locally. The most common sources of packaging materials were Tetra Pak (SA), Golden Era Packaging (SA), and Fast Prints and Packaging (India). Although firms would like to source packaging materials locally, for example, from Nampak Zambia Ltd, there are concerns about quality and the unreliability of some suppliers.

Additionally, one of the major root causes of poor packaging that emerged from the interviews is the lack of appropriate testing equipment to guarantee quality. Firm interviews and interactions with different informants reveal that there is little to no institutional support from government to improve packaging in Zambia. Although some firms have in-house packaging materials, testing facilities, and equipment, such capabilities remain nearly non-existent among small processors. The University of Zambia, ZABS, and Food and Drugs offer alternative testing services to small and medium without in-house laboratories, including those firms looking for cross-examination of their products.

To mitigate the challenges faced by the packaging industry, ZABS recently acquired a new testing machine called IMPEE Porta LAB, which is a mobile unit with the capacity to perform over 50 tests across a wide range of packaging materials, including tins, plastics, cans and many more. The machine was purchased under the *Promoting Intraregional Trade in East Africa Initiative* as part of the technical assistance rendered by the International Trade Center (ITC) and the Finnish Government. Tellingly, this development has enabled ZABS to test the quality of packaging materials for local producers, the manufacturers of processed foods, and importers to ensure conformity to market standards.[46]

Representatives of Technoserve were also interviewed. Technoserve has helped to improve the packaging and branding of processed foods, including soya products for human consumption,[47] such as edible oil, mince, burgers, corn-soy blends, and other products. Coupled with enhanced processing technologies, attractive packaging, and competitive pricing systems could expand opportunities for local processors. Human-destined soya products are mostly imported from South Africa and mainly distributed in chain stores like Shoprite and Pick n Pay. Ensuring continuous research and the development of new products from agricultural crops, including soya beans can promote value-addition, provided packaging is improved.

[46] Interview with an official from ZABS, 28th August 2019
Also see http://www.intracen.org/news/Zambia-Bureau-of-Standards-promotes-higher-quality-packaging-for-producers/

[47] Although not well estimated, the production of soya products for human consumption has been increasing in relation to that of stock feed.

6.5 Trade, Logistics and Agro-Processing Industries

Zambia is strategically located in its region, surrounded by eight countries which are potential export markets.[48] The country also forms the intersection of two trading blocs: the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC). Zambia's position opens opportunities for food processing firms to move beyond the domestic market. The inception of the African Continental Free Trade Agreement (AFCTA) provides more international opportunities for the agro-industry to leverage for industrial development. This will be enhanced by the improvement in intra-regional transport between urban hubs (Vilakazi & Paelo, 2017;2017; Woolfrey & Verhaeghe,2017).

Despite the successes achieved by these regional trading initiatives, Zambia still faces significant challenges regarding the trade in processed foods. Companies that imported processing equipment and machinery, packaging materials, and other industry requirements complained of high import taxes, corruption, and border inefficiencies that erode their competitiveness. "*The main challenge is border inefficiencies and corruption. They (border officials) usually say the system is down. But if you are efficient, the truck should not stay for long. Currently, it takes about 2-3 days to have your truck cleared and, in the end, this gives us additional costs, for instance, it delays delivery to our clients and we have to pay the driver for those extra day [SIC]*," stated an informant from large processing firm.

An interview with another medium-sized firm exposed the country's incapacity to handle sanitary and phyto-sanitary (SPS) issues. "*We are certified by ZABS, but the problem is that it is not internationally accredited. So even when you export your products, they require us to test them again. Even being in SADC sometimes does not quite help. Then when we go back to ZABS, they say we have a MoU, but I think does not work [SIC],"* lamented an informant. Although institutional efforts, though weak, have been put in place to tackle such issues, it also seems that individual actors in the agro-value chain cannot still meet regional and international market demands.

[48] It is estimated that there are 300 million people in the region, which gives Zambia a sizeable market to exploit.

In the current climate of globalization, competitiveness, compliance with standards, and quality assurance, have become important non-tariff barriers in the trade of food and processed foods. Therefore, for highly traded products such as edible oil, oilcake, oilseeds, and other such processed foods, there is an urgent need to harmonize standards and improve border efficiency to increase trade and regional industrialization. Considering the cumbersome nature of multilateral agreements such as SADC, an alternative approach is to enter bilateral arrangements. For example, ZABS has an MoU with Botswana on the export of legumes, specifically groundnuts, and with Namibia on a range of products (Bosiu *et al.,* 2017). However, as several firms pointed out, such arrangements need to be made more efficient and effective.

To further strengthen competitiveness along the soya bean value-chain, infrastructure, and logistical needs, both for cross-country and in-country trade, must be enhanced so that more opportunities are created for the agro-industry.

6.6 Financial Services for Agro-Industries

Growth-oriented SMEs, particularly in agriculture and agro-processing, are essential to industrial development in Zambia. Agriculture and agro-processing, however, are perceived as risky businesses for most financial providers. Consequently, the agro-industry is viewed as an unattractive option for funders, who mostly are looking for high returns, especially in high-risk environments.

Interviews cited access to finance as one of the binding constraints faced by agro-food processors in Zambia. Local commercial banks and micro-finance lending institutions usually have stringent requirements that discourage those seeking finance. *"The banks' requirements in terms of collateral, their demands are too high. What they demand from you is as good as telling you we will not give you the money [SIC],''* complained an informant from a small firm.

Generally, lenders impose "burdensome conditions" that small and medium-sized processors described as unrealistic demands. Processors cannot afford to access finance because of the

repayment methods and the interest attached to the loans, which are too burdensome coupled with currency volatility. An interviewee at one of the large processing firms remarked that "*...the currency which is not stable it means you spend more. Also, most of these machines are capital intensive and so that the amounts involved are colossal. If we are to borrow money for these capital -equipment's, how will the lending rates from financial institutions be? Like right now they are quite high, meaning even what we are going to repay will be very high. So those are the challenges we are facing. Believe me; the owners of this company would want to invest in the best technology [SIC].*"

Emerging food manufacturers, especially those that aspire to enter the export business field, require finance to procure more advanced machinery and processing equipment. Even firms that tend to focus on the local markets, such as supermarkets, still have similar experiences.

Development Finance Institutions (DFIs) continue to provide a wide range of capacity-building initiatives to early-stage firms and large private corporations, whose financial needs are not adequately met by private commercial banks and local capital markets. The Private Enterprise Programme (PEP) Zambia has sought to improve SME agro-producers' financial access by co-investing in their businesses. PEP has also created several connections with development finance institutions and other players offering private equity funds. Other DFI's providing funding in the agriculture and agro-processing in Zambia include Africinvest, CDC Group, Finn Fund, Development Bank of Zambia (DBZ), IFU-Investment Fund for Developing Countries, and FMO (Entrepreneurial Development Bank). For instance, CDC Group has completed deals in agro-processing sector, with a total capital inflow of USD85 million between 2015 and 2019 (Kukula, 2019).

6.7 Other Competitive Factors

Access to raw materials

Access to raw materials is, of course, essential to the production process. Although it was not highlighted as one of the major constraints, informants still expressed some concerns over their

ability to secure raw materials that were of the required quality, consistent in volume, and affordable.

Soya beans, the basic raw material, are largely sourced locally from two main sources: small-scale farmers and commercial farmers. While large processing companies can access raw materials through their integrated business models, this is not usually the case for small and medium-sized processors. Through out-grower schemes, firms can secure quality soya beans and, in the process, support small-scale farmers with inputs such as seed, fertilizer, and training. The representative of one large processing company observed that, as a result of this scheme, "*The quality of the raw materials (soya beans) is quite good because through the out-grower scheme we would tell our farmers the kind of seed that will give them good seed and also which has high value of oil in it [SIC]."*

Another processing company indicated that it grows 30,000 tons of soya beans through the out-grower scheme, which is approximately 60% of its required inputs. The rest is sourced from other farmers. An important lesson from such arrangements is that firms can secure raw materials while at the same time, empowering farmers through input financing and training on good agriculture practices and can create a ready market for soya beans.

Zambia still depends on rain-fed agriculture, and in seasons of drought the supply of soya beans is affected. Firms must compete for whatever beans are on the market, and in some instances, must turn to Malawi to supply sufficient soya beans. *"The past two years we've had challenges in terms of securing enough raw materials because of the rainfall pattern. So, we had to scramble for what was on the market [SIC],"* an official from a large processing firm complained.

Infrastructure

Good infrastructure is necessary for industrial development. Although Zambia's infrastructure has generally improved, interviews with firms and stakeholders suggest that infrastructure remains one of the major bottlenecks, especially in rural areas. Accessing farmers in rural areas who supply soya beans is still a challenge, owing to the bad road network and poor connectivity. *"There are a lot of farmers in rural areas that grow soya beans, and, in most instances, we cannot go off the road to collect the crops [SIC],"* said a company official. Investing

in key infrastructures, such as feeder roads, bulking and storage centres, and communication is fundamental for developing the agro-processing industry and enhancing rural industrialization.

Energy Access

Most of the informants complained of power outages in the country. Currently, Zambia Electricity Supply Corporation (ZESCO), a power utility company, is implementing a minimum of 12-hours load shedding, daily,[49] and firms expressed anxiety about how energy uncertainty is undermining production levels. According to firms, the frequency of power outages has forced them to run on expensive alternative energy, adding to already high production costs and exacerbating the lack of technical efficiency. This, however, presents an opportunity for government to invest in more sustainable energy sources to support the development of manufacturing and agro-processing activities.

Informality of food markets

Zambia has a large informal market. The constraints of a growing informal sector have put more strain on those regulating and maintaining food safety standards in the economy. Interviews suggest that agro-food processors involved in the informal sector are not adequately represented in policy and support services discussions.

[49] About 85% of Zambia's power comes from hydroelectricity and in recent years Zambia has been hit with droughts, forcing the power utility company, ZESCO, to shut down some of the plants.

7. THE ROLE OF GOVERNMENT AND MULTINATIONAL COMPANIES IN SUPPORTING LOCAL AGRO-PROCESSORS IN AGRO-VALUE CHAINS

As well as agro-processors, several state and non-state actors play a significant role in shaping the food industry's development. This section looks at some of the interventions made by state and non-state actors to develop the agro-processors' capabilities in Zambia.

7.1 Firm-Level Interventions

Building capacity for local agro-food processors through technical assistance, market intelligence, linkage development, innovative finance, and the transfer of technology and skills are vital steps to harnessing the potential of agro-industry for structural transformation. There are several firms, especially SMEs, which are involved in agro-processing activities in Zambia.

Java Foods is one of the fastest growing agro-food processing firms operating in Lusaka and endeavours to meet the formal and informal markets' nutritional needs. To help Java upgrade its production and processing capabilities, Partners in Food Solutions, a consortium of leading global food manufacturers – Cargill, Generals Mills, The Hershey Company, Bühler, Royal DSM, and Ardent Mills – became involved to strengthen and increase the competitiveness of the firm. See case box 2 below.

As a result of the firm's support along the soya bean value-chain, Java Foods is working on integrating more actors to strengthen the value chain, for instance, out-grower schemes with smallholder farmers and the local sourcing of inputs. Sourcing soya beans locally has stimulated the demand for the product, thereby helping farmers to generate more income and creating more direct and indirect jobs along the value chain. Furthermore, incorporating soya beans in the production system has enabled Java to diversify its product portfolio to cater to a wider range of consumers in both formal and informal markets.

BOX 2: Java Foods

Java Foods is a fast growing agro-food processing company based in Lusaka, Zambia. Founded in 2012, the company's vision is to provide affordable, high-quality, and nutritious processed foods to the Southern African market made from local products. Java Foods is the first manufacturer of indigenous instant noodles, called eeZee instant noodles, now becoming a leading local brand among domestic consumers. The company also manufacturers Num Num snacks made from soy and maize flour.

Considering the company's growth trajectory and its long-term goal to be the leading food processing company in the southern African region, investment is still required in processing technologies, technical skills, quality control, and certifications. Java Foods recently managed to acquire new machinery from China through co-investment by a private equity fund. Partners Food Solutions then stepped forward to assist Java in designing the factory layout to increase efficiency and prevent future processing issues.

As a result, Java recently launched a new product on the market, called eeZee Supa Cereal, a Corn Soy Blend (CSB) fortified with essential vitamins and minerals and infused with a variety of flavours. This has helped the company to expand and diversify its product line and create further opportunities in the community. The company currently has about 19 full-time workers, with roaming sales agents, mostly youths, who sell Java products in marketplaces and in their communities. Java is also organizing farmers to form an out-grower scheme to strengthen the food value-chains in wheat, maize, and soya beans further.

The company has now established a supply link with Shoprite, the largest retailer in Zambia with about 32 retail stores across the country. Shoprite sources almost 70% of its products locally, thereby creating opportunities and partnerships as well as linkages that enhance the participation of local suppliers like Java in food value-chains.

Source: Interviews with Java and company website http://java-foods.com

The presence of large multinational companies, such as Mount Meru,[50] plays a key role in shaping the agro-processing in Zambia. As a manufacturer of edible oil,[51] soya oilcake, and other products from soya beans, cotton, and sunflower, the company has strategic interests in implementing a local sourcing strategy and in value-addition for agricultural products. In the soya bean value-chain, the company is increasing its engagement (via out-grower schemes with smallholder farmers) with local actors by sourcing 100% of its raw materials (soya beans) from

[50] Mt. Meru is headquartered in Dubai and focuses on operations in downstream activities such as edible oil manufacturing, logistics, petroleum, infrastructure, and LPG (gas).

[51] Mt. Meru has a 20% market share in the edible oil industry. The capacity could further be increased, despite the intense competition from imported edible oil, both crude and refined. Zambia is estimated to import 60% of its edible oil. Industry players, however, think that import substitution interventions will help protect the local industry from unfair trading practices.

local farmers: 95% from commercial farmers and 5% from smallholder famers. Further, the company invested $5 million[52] in early 2019 to expand its refinery, storage capacity (silo), processing capabilities and packaging units. Apart from setting up out-grower schemes in the soya bean value-chain, the company is also conducting feasibility studies to expand into new products through the development of an integrated social and environmental management system to support the recently acquired ISO 9001 and HACCP certification.

7.2 Institutional Support for Processors

Institutional support for the agro-processing industry, particularly through interventions targeting SMEs, is a prerequisite for developing a competitive and inclusive industrialization agenda. Zambia's agro-food processing industry ranges from micro-to-small to medium-to-large local and multinational firms, with each category facing similar challenges, albeit at different magnitudes. Addressing the needs and constraints inherent in the food sector and capacitating the local firms calls for both state and non-state interventions.

In this regard, the Ministry of Commerce, Trade and Industry, through its implementing agency, the Zambia Development Agency (ZDA), runs an SME division to build capacity, working alongside its partners, which include line government ministries and other agencies, development finance institutions, private business associations, and others. Recently, ZDA, in collaboration with the International Trade Center (ITC), launched a project aimed at improving the international competitiveness of SMEs involved in agro-processing and facilitating trade for them. Using the Trainer cum Counselors (TcC) capacity-building methodology, the project's overall goal is to increase the participation of local food processors in agro-value chains. The TcC framework is also being piloted in East African countries such as Tanzania, Kenya, and Rwanda.

According to the interviewee at ZDA, more than 12 processors have participated in the project. These participants are expected to share the knowledge they have acquired with other

[52] Funded by the African Agriculture and Trade Investment Fund (AATIF). AATIF is a public private partnership that provides strategic finance to small-, medium-, and large-scale firms along the entire agriculture value chain. https://www.aatif.lu/news-detail/the-africa-agriculture-and-trade-investment-fund-aatif-invests-usd-5m-in-mount-meru-millers-zambia-a-leading-edible-oil-producer.html

processors after the completion of the project. The project provides technical assistance that responds to food-safety management systems' inherent challenges, including HACCP and ISO compliance, at enterprise level. Also, to complement the project, processors are trained in good manufacturing practices, supply chain management, product development, branding and packaging, and distribution.

Such an intervention comes at a time when ZDA is limited to providing institutional support to agro-processors. Interviews suggest that although ZDA has regional offices, the agency is either understaffed or under-resourced, thereby failing to adequately fulfill its critical responsibility in enterprise development. One way of addressing institutional issues, as suggested by interviewees, is to strengthen partnerships with other key organizations with a similar interest in the agro-sector, in order to increase the impact and scale of interventions. Increasing systematic engagement between government and the private sector was seen as the starting point. Different initiatives are running, aimed at addressing the nexus of food processing, nutrition, and inclusive industrialization. However, all of these will require both state and non-state actors to commit to supporting agro-processing activities.

Technoserve is a non-state key player actively supporting the agricultural and food manufacturing sectors in their quest for economic growth and inclusive industrialization in Zambia. Launched in 2012, the Solutions for African Food Enterprise (SAFE) project was designed to strengthen the food processing ecosystem by means of various interventions. According to interviews and SAFE's project report,[53] SAFE illustrates the significance of strengthening value chains by linking producers, processors, and retail markets (see box 3 below). As a result of receiving technical support on product development, testing, product certification, and supply chain strategies, processors have been able to supply a variety of products, such as corn soy blend, baked foods, vegetable oils, snacks, fish feed and sauces, to retail markets and institutional buyers such as the World Food Programme (WFP) and hospitals. At the downstream manufacturing level, 100 processors were trained in food quality, soy flour fortification, mycotoxin control, market linkages, and finance access. Soya bean farmers,

[53] https://www.technoserve.org/files/downloads/solutions-for-african-food-enterprises-final-report.pdf

meanwhile, benefitted from training in good agricultural practices and input financing, coupled with the introduction of de-hulling and harvesting machinery.

Box 3: Technoserve (TNS) Zambia: Building Capabilities for Local Food Processors

In 2012, Technoserve (TNS), together with its partners the U.S Agency for International Development (USAID) and Partners in Food Solutions, launched a US$6.4 million project called Solutions for African Foods Enterprise (SAFE), which focused on increasing the competitiveness of the food-processing industry and expanding the provision of affordable and nutritious foods. The project design aimed at addressing some of the major pressing issues that local processors in various food value-chains, including the soya bean value-chain, continue to face. To do this, the project developed specific interventions to enhance the competitiveness of food value-chains.

Through the SAFE project, TNS helped local food manufacturers produce and market high-quality and safe food products while creating sustainable market linkages to support local farmers. The transfer of knowledge and technical assistance were among other benefits that food processors realized from the project. The project assisted about 9, 000 smallholder farmers and trained 100 participants in food safety to create an inclusive soya industry and improve productivity and efficiency along the value chain.

Technical assistance included: systems and product advancement, product development, equipment and factory upgrading, and compliance with standards, such as Hazard Analysis Critical Control Points (HACCP) and International Standards Organization (ISO), with a focus on improving food safety, product quality, and management systems. As well, SAFE offered specialized technical advice on business and market linkages, packaging, branding, recordkeeping, and financial management. SAFE was also instrumental in providing investment and financial services which had affordable and competitive rates.

Source: Interviews with Technoserve (27th August 2019) and project report[54]

Another key institutional player supporting the food processing industry is the Private Enterprise Programme (PEP) Zambia, funded by the UK Department of International Development (DFID). Under the Value Chain Strengthening Initiative, PEPZ works on three broad themes: Capital (co-investment and financial design); Capacity (external technical and advisory assistance); and Connections (fostering of market linkages) to facilitate and create strong linkages between producers, food aggregators, processors, packaging providers, logistics firms, and retail markets.

[54] Refer to https://www.technoserve.org/wp-content/uploads/2018/04/solutions-for-african-food-enterprises-final-report.pdf

In the soya bean value-chain, PEPZ brokered a deal with an agro-processor who initially worked with 400 farmers, but after PEPZ's co-investment in the factory, the processor was able to buy soya beans from more than 1000 farmers, increase tonnage and the processor's capacity expanded by more than two-thirds. Farmers have also been trained, helping them increase the area cultivated and their yields. As a result of farmers following good agricultural practices, the quality of the soya beans produced has improved, positively impacting profitability.[55]

Similarly, Musika Zambia, a non-profit organisation, is implementing a market development initiative in agricultural value chains, including legumes such as soya beans, which seeks to improve the "capacity of [the] food-processing industry to create commercially viable distribution channels for affordable nutritious foods and accompanying nutrition into the rural market."[56] Musika works with selected food processors to develop sustainable and inclusive business models that provide acceptable and affordable nutritious food products to "bottom of the pyramid" customers in rural Zambia through its sector-wide interventions. According to the interviewee, Musika has managed to strengthen small-to-medium food processors' capacity to produce and market high-quality and affordable processed foods to meet local retail demands. Additionally, Musika has been pragmatic in helping rural agro-processors develop not only by providing important market linkages to the agricultural supply chain but also by changing farmers' attitudes towards improved agricultural practices. Musika's development initiative helps to broaden the rural industrialisation base by strengthening agricultural commodity value-chains, value-addition activities, the creation of non-farm employment, and improving incomes.

Although these support services and interventions provided for the agro-processing sector have had a significant effect on revitalizing the food sector, they are limited in duration. Funding ends and unfortunately, some beneficiaries tend to regress when direct support ceases. But when skills are transferred, linkage development is enhanced, and when this is coupled with a stable environment and full government support for the private sector and vice versa, then industrial development through agro-processing can be achieved.

[55] Interview with a consultant at PEP Zambia, 22nd August 2019
[56] Interview with project officer at Musika Zambia, 20th August 2019

7.3 The Role of Supermarkets in Capabilities Development

In the last two decades, the number of supermarkets in Zambia has increased dramatically, mainly spearheaded by chain stores such as Pick 'n' Pay, Shoprite, Spar and Food Lovers Market, all based in South Africa. Supermarkets provide key routes to markets for foods and processed foods. According to Ziba and Phiri (2017), in Zambia, supermarkets' format and location have evolved over time from serving high-end rich urban areas to penetrating low-income peri-urban and rural areas.

Although this expansion is mainly driven by increased urbanization, growth in incomes, political and economic stability, and deepening regional integration, and shifts in demand towards sophisticated processed products by the middle class, Ziba and Phiri (2017) also show that participation by Zambian local food processors in agro-value chains remain limited, owing to either strategic or structural barriers. Firms attempting to access value chains by supplying supermarkets and large food companies face a daunting array of difficulties, many of which are outside their control because they relate to governmental responsibilities. The outcome is underinvestment and limited upgrading.

However, interviews and some secondary data (Ziba & Phiri, 2017; das Nair et al., 2018; das Nair & Landani, 2019) seems to suggest that supermarkets procure locally as much as possible.[57] For example, Shoprite currently buys from over 100 local companies within Zambia, with the balance of their supplier base (a total of 350 companies) coming from either value-added products or imports. Supermarkets argue that their local sourcing policy is directly or indirectly assisting in building capabilities for local processing firms. Java Foods is one agro-processor that has benefited from supermarkets' presence (see box 2 above).

While this inward sourcing is a good way to build capabilities for local food processors, supermarkets expressed concerns over local suppliers' ability to adhere to packaging standards. They mentioned issues with quality, barcodes not being GS1 compliant, a lack of consistency in

[57] However, anecdotal evidence seems to suggest supermarkets are not willingly procuring locally but because of government pressure influenced by the local content policy local sourcing is improving.

volume, and regularity of supply, logistical problems, among other concerns. On the other hand, supermarkets believe that there are major opportunities in areas such as filling the gaps which are currently met by imports,[58] the need for one-stop office/shop for supplier education, the formation of cooperatives, investment in IT infrastructure, and improving the local packaging industry. Definite steps need to be taken to meet these challenges and take advantage of these opportunities, such as supermarkets offering supplier development programmes (SDPs) to allow local processors to gain more access to formal markets.

One step taken to help local suppliers and food processors is the signing of a Memorandum of Understanding (MoU) between Shoprite and the Zambia Development Agency (ZDA). The terms of the memorandum involve Shoprite sourcing value-added products in processed foods and chemical products from local firms. Also, the Private Enterprise Programme Zambia (PEPZ) entered into an MoU with Shoprite as a complementary intervention to connect local food processors to formal markets.[59]

Regionally, research by Ziba & Phiri (2017), Nkonjela & das Nair (2018) and das Nair & Landani (2019) seems to suggest that there are very few suppliers development initiatives in the manufacturing sector that are supported or spearheaded by supermarkets. This is because such initiatives are costly in terms of resources required and planning time. For instance, developing a specific sector, identifying suppliers' quantities to buy, requires substantial coordination by several players, including government. Although it is still nascent, the Namibian Retail Charter is one concrete SDP that seems more intentionally and deliberately supporting a local content strategy.

7.4 Afterthoughts: Why the value chain approach makes a compelling case to develop an industrial strategy.

This study used a value chain approach to analyse the agro-food processing industry's potential for industrialization in Zambia. The approach's strength lies in its ability to break down segments of the value chain to optimize efforts, eliminate inefficiencies, and improve

[58] As of 2019, Shoprite only imports 12% of its inventory; 41% is fully sourced from local manufacturers and 47% from local agents.
[59] Interview with a consultant from PEP Zambia, 22nd August 2019

profitability. Further, the value chain helps to provide useful insights that can bring the greater outcome to the end-markets.

Accordingly, this study has provided a compelling argument for a sub-sectoral industrial strategy, nested within the broader industrial development agenda, to support Zambia's industrialization process, using the soya bean value chain. Soya beans was chosen because it presents the opportunity in the processing of the present and growing demand of human and livestock feed, especially the growing poultry industry which is heavily dependent on soya beans as a key ingredient in the poultry feed formulations. Soya beans are also attractive as a cash crop from several economic, social, and environmental considerations. Additionally, soya beans provide smallholder farmers in Zambia an opportunity to diversify their household income and enhance food and nutrition security. Soya beans also complement the predominately carbohydrate rich diets and diversify household income for many poor farmers.

From the government policymakers' perspective, development of the soya beans processing sector should be understood primarily as a means for, among other reasons, promoting export-led growth, reducing expensive imports and as a strategy for increasing dietary protein of households, either by being consumed directly or as poultry. Soya beans processing is a significant source of employment creation and value-addition or spillovers to the broader economy, given its industrial linkages with adjacent value chains as discussed in section 5.4.

In general, governance of the soya bean value chain in Zambia has a certain degree of coordination in which independent actors/firms link to each other in networks to find means to exchange products and knowledge to be competitive. This study noted the power that dominant actors and suppliers exercise in the soya bean value chain, the coordination mechanisms that transactions and the flow of knowledge in the value chain, and the nature and quality of relationships processing firms maintain among themselves and with service providers and regulatory agencies.

Starting at the farm level, commercial farmers are largely the leading producers of soya beans, accounting for about 75%-95% of the soya beans production. Commercial farmers sell most of their soya beans to processors who have arrangements and clearly defined markets that may

involve forward contracts and preferential procurement arrangements. Although some smallholder farmers operate under out-grower schemes, a significant proportion struggles to access confirmed market intelligence, finance, inputs, and requisite infrastructure.

Agro-processors interviewed for this study manage out-grower schemes with well-developed extension services that rely on lead farmers' networks supervised by processing firms' staff, who train and support other farmers in adopting and implementing good agricultural practices. In return, farmers receive a commission for soya beans sold to processors. Consequently, processors manage to reinforce existing leadership and a certain degree of control on farmers that recognizes the relationship between trade benefits (i.e negotiating contracts, prices, volumes, and quality of soya beans) and compliance to good agricultural practices.

However, analysis of the soya bean value chain in Zambia reveals smallholder farmers' participation presents complex outcomes that often disadvantage farmers. The rise of soya bean as a major cash crop for smallholder farmers and input-induced agricultural intensification has led to the restructuring of the agro-food systems on which rural households depend. Arguably, high input, intensified farming practices have made farming, to some degree, more capital intensive as framers attempt to improve their soya bean yields to sustain higher household incomes. Consequently, this exposes farmers to new constraints and pressures that leave them indebted and dependent on credit facilities to participate in the soya bean value chain. The promotion of rotational cropping and the increased use of pre-emergence herbicides for soya bean production has displaced traditional shrubs and crops that typically grow beside staple and cash crops. This has resulted in reduced crop and food diversity among smallholder farmers.

At the processing level, processing of soya beans is mainly undertaken by commercial processors who have invested heavy-duty and recently, automated processing equipment. Some of the commercial processors, for example, Novatek is vertically integrated and produce some of the soya beans they process, while outsourcing the remainder from local producers such as smallholder farmers. On the other hand, small scale processors with basic knowledge on how to conduct processing are emerging. These producers are processing it at home to produce soy meal/flour for adding in mealie meal porridge, baking and/or making soy snacks,

while other process it for incorporating into formulations for feeding their livestock, particularly the poultry sector.

According to the reviewed literature supplemented with field observations, the Zambian soya bean processing sector has five main types of players. First, integrated feed manufacturers who produce animal feed and are often vertically integrated into livestock production. These include Parrogate, National Milling Company, Novatek. Second, producers of cooking oil, both refined and crude, automatically produces soya cake that is either sold or processed. These firms include Mt. Meru and CMR farms. Third, oil producers that refine edible oils are often involved in oilseed crushing, and trade soya cake to other players. These key players include Unifield Chemicals, Parrogate, Hi-Protein Ltd, Gourock International, and other small players emerging in the market. Fourth, livestock feed producers (most vertically integrated) from bought soya cake, for instance, Novatek, Tiger Feeds, Nutri Zambia, National Milling, and Pembe Milling. Last, processors of foods for human consumption, for example, Seba Foods, Java Foods, Essential Commodities Ltd, Trade Kings, and COMACO.

The above-identified agro-processors, particularly the leading companies, have shown potential for upgrading opportunities by either undertaking process improvements or increasing the product line obtained from soya beans. Large firms interviewed in Lusaka indicated that they acquired soya expellers and automated technologies to improve their refineries' efficiency. Granted, processors have been able to manufacture and promote high quality, organic, and value-added processed products. Aside from seed itself, oilcake and edible oil, soya beans product line characterizing high value marketable such as soya milk, soya flour, textualized vegetable products, bakery products, as well as soya bean fortified foods such as porridges are now making their way to the end markets, including supermarket chain stores like Shoprite and Choppies.

Firms attempting to access value chains by supplying supermarkets and large food companies face a daunting array of difficulties, many of which are outside their control because they relate to governmental responsibilities. The outcome, however, is underinvestment and limited upgrading. While firms processing soya beans have exhibited potential for upgrading, the ultimate consumer determines which products are purchased in the market. As such, firms in

this value chain need to consider meeting the end-markets' demands to determine how best to consistently innovate, how best to sell their products, and to understand the quality and food standards required. Meeting volumes, standards and quality adherence, packaging, labelling, and maintaining consistency remains a huge problem for processors, hence being strategically or structurally excluded from supplying to supermarkets. Government policy must therefore address these impediments that local firms face in accessing end-markets. Additionally, policy strategy must encourage local sourcing either directly or indirectly as it will help build capabilities for local processing firms, thereby stimulate local industrialisation.

8. CONCLUSION

This study examined how the development of the agro-food processing industry could potentially lead to upgrading and capabilities opportunities for firms that would support the industrialization of the Zambian economy. The study primarily sought to understand how value addition in the food sector has evolved, and based on trade data, what upgrading opportunities are there in the agro-food value chain to enhance industrialization. Further, the opportunities and challenges that agro-food processors face were investigated. The roles of state and non-state actors in supporting the capabilities development of the food industry were discussed.

The study showed that Zambia has historically failed to diversify its economy from traditional mining activities, which have in the past been the backbone of economic growth and development. However, in recent years, Zambia has witnessed substantial income growth, population increase and urbanization, prompting the question of whether agro-processing could stimulate manufacturing activities to meet increased demand for processed foods. The Zambian government recognizes the urgency of economic diversification and transformation, and the agro-processing industry has been identified as a growth sector to facilitate structural transformation. But, for the most part, agro-value chains that can support industrial development remain underexploited.

The soya bean value-chain is one of several key agro-value chains in Zambia whose potential for processing into diversified products remains untapped. However, this study observed no specific policy support for soya bean production, particularly not any aimed at increasing smallholder participation. A properly aligned and nuanced industrial policy must be developed to take advantage of the soya bean trade's regional and global dynamics. Research reveals that soya beans have multiple industrial linkages and uses, which the manufacturing industry could leverage for value-addition and export promotion. Soya beans can be converted to several industrial products, including soya oilcake for the animal and poultry industries, edible oil, and products for human consumption, such as milk, corn-soya blends (CSB) and many others. The presence of large processing firms and other emerging industrial actors means that there are numerous opportunities to capacitate the local processing firms though skills transfer, market linkages,

the local sourcing of inputs, and the introduction of new processing technologies to small firms to encourage processing and the use of soya beans as a food security crop.

However, the value chain is met with numerous challenges that compromise its competitiveness. The principal issues related to the competitiveness of soya beans are: production capabilities and the security of quality inputs, irrigation and other supporting infrastructure, low or weak extension services, investment in storage and aggregation facilities, investment in handling and grading, and market information.

Furthermore, it emerged from the study that Zambia's agro-industry, especially at the basic manufacturing stage, faces significant challenges with meeting market standards and certification requirements. There are significant gaps in the basic principles, for example, in good manufacturing practices, such as Hazard Analysis Critical Control Point (HACCP), and their implementation and availability in the country in a way that would make the process more accessible and cost-friendly for small and medium-sized agro-processors. In the current era of globalization, in which competition has become increasingly important, food processors' adherence to food safety standards is an absolute requirement to guarantee consistency in quality and the competitiveness of their products and services. Poor conformity to food standards leads to systematic exclusion from the local, regional, and international markets where these schemes are compulsory. For this reason, ZABS and its aligned agencies are urged to build an effective and strategic partnership with the food manufacturing sector to improve Zambia's competitiveness in processed food products.

Deficiency in technical skills is yet another critical barrier that agro-food processors in Zambia encounter. Developing a competitive agro-industry requires technical skills related to food safety management, installation, and mechanical competency. Although Zambia has a relatively educated labour force, technical skills that can support the implementation of food-safety management systems are either scarce or costly to maintain, especially among small-to-medium processors. Also, some firms have difficulties finding competent people to install, set up and/or repair modern machinery in their factories. Training programmes and the scaling of existing initiatives aimed at offering technical and advisory support services to address

immediate demands in the manufacturing and agro-processing industries are among the crucial measures needed to grow the food industry.

Further, interviews and secondary sources indicate that a significant proportion of processing firms still operate with basic processing technologies; this is especially the case among small and medium-sized processors. A review of agro-value chains studies indicates a tremendous disparity among agro-processors as far as value addition is concerned. In fact, in the soya bean value-chain, the level of agro-processing in rural areas remains extremely basic, unlike the situation of large firms in the light industrial area of Lusaka. This is linked to limited access to technology resulting from a lack of technical skills and the technology's unaffordability. Cognizant of this situation, government and other non-state actors are increasing their efforts to minimize the deficiency through co-investing and other multi-stakeholder interventions.

Similarly, with heightened competition from foreign companies, the packaging constraints for food processors, especially among SMEs, have also increased. The Zambian food industry is faced with serious difficulties related to both the lack of and cost of packaging and labeling advisory services, with designing, with testing, and with the absence of information on where to source packaging materials. These challenges seem to be more pronounced among small and medium-sized processors, who in aggregate terms constitute the bulk of food manufacturers in Zambia. Addressing these challenges, Technoserve and PEP Zambia, together with government through ZABS and ZDA, have helped resolve some of the food packaging problems.

Developing the agro-industry in Zambia will also require enhancing in-country and cross-border trade. The creation of regional trading blocs and the inception of AfCTA offer greater opportunities to facilitate the export of processed foods, which would support regional industrialization. The demands of globalization, competitiveness and conformity to national and international standards will play a major role. Zambia's agro-sector has great potential but its growth in constrained by several factors such as harmonizing regional standards, entrepreneurial capacity, market intelligence, and the modernization of food processing. Zambia's strategic location in the region makes it a trading hub, but inland structural bottlenecks must be addressed.

The lack of access to affordable innovative finance further constrains the agro-industry and has far greater consequences for industrialization. In Zambia, commercial banks operate at very high-interest rates, which are prohibitive for many small-to-medium agro-processors. Moreover, agriculture and agro-processing are seen as risky ventures and therefore, lenders impose "burdensome" collateral demands. However, some commercial banks and other private development finance institutions are beginning to provide affordable credit lines, focusing on small-to-medium enterprises.

Zambia's agro-processing's development and competitiveness cannot be seen in isolation from the competitiveness of securing quality raw materials. The lack of input finance, technology, and general infrastructure such as energy needs to be addressed, together with the need to provide basic grading and packaging facilities to enhance upstream activities in the value chain.

In light of the above issues, the study proposes that state and non-state interventions and initiatives must focus on addressing the following issues: low agricultural productivity, which is usually the root problem in the agro-industry, access to technology, meeting market standards, and certification schemes, access to finance, weak capacity building and market linkages, and issues related to infrastructure.

Summary of Key Interventions

- **Develop specific and nuanced industrial policy strategy to support soya beans particularly aimed at growing small-scale farmers**
- **Build systematic relationship between government and multinational donors: linking smallholder farmers and processors into value chains to ensure sustainability beyond project life cycle.**
- **Engage government to build capacity for institutions like ZABS and aligned institutions to improve food testing, packaging, and certification schemes, as well as harmonisation of regional standards.**
- **Upgrade and improve agricultural efficiency through extension services, promote good agricultural practices (GAP), and invest in storage and logistics to ensure quality and availability of soya bean raw materials.**
- **Improve access to finance (specific credit schemes for SMEs), facilitate co-investments by both state and non-state players, for instance, in the acquisition and installation of processing technologies.**

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