“Exploring the scope for regional industrial development through the case study of soy agro-processing in South Africa, Zambia and Zimbabwe”

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Abstract
The shifting food consumption patterns associated with the rise of the middle class in Sub-Saharan Africa have triggered a growth in the demand for poultry, with a demand pull effect for soybeans, one of the main components of animal feed. The growth in demand and subsequent production and processing responses to meet this demand, have been hailed as a path towards industrial development at the national and regional level. These consumption and production developments have shifted national discourses on industrial policy towards agro-industrialisation, understood as growth of value added and diversification on soy products. Agro-industrialisation is presented as source of optimism given associated expectations of job creation, improved food security, skill and technology development, and diversification into other end-products, which for soy includes biofuels, cosmetics, pharmaceuticals and other soy-based industrial food products. This paper argues that this optimism is premature and growth potential unsustainable at the national and regional level. The theoretical discourses do not fully address the gaps in understanding the mechanisms by which a combination of demand and supply growth, or an increase in agro-processing, in the short term, can translate into a longer-term and self-sustaining pattern of agro-industrialisation. Delving into this conceptual gap and using evidence from the soy value chain, this paper shows the absence of structural change, the concentration of capital and power in the hands of processors and traders, and the emphasis on prices and costs with a short-term focus. These factors combine to produce a set of conditions where the formation of broader linkages to support industrial deepening and diversification is restricted. This contributes to the narrowing of the existing power and accumulation structures reflected notably by the absence of employment creation and mistrust regarding regional collaboration.

The notion of agro-industrialisation presents the space to explore a conceptual gap between what is narrow sector development and what constitutes broader economy-wide industrialisation. Bridging the theoretical gap requires consideration of how sector development fits with or contributes to broader industrialisation dynamics, and necessitates a shift in thinking about industrial development beyond national boundaries and short-term value capture. This also implies the need for a shift in the policy and industry actions away from ones confined to firm-level growth in the short-term or the upgrading of value added as understood by the global value chain thinking. Alternative avenues of understanding industrial development and deepening highlight the role of employment creation, fostering linkages beyond the narrow input-output
relations, identifying and deepening areas of cross-border collaboration, and promoting a redistribution of power and resources more evenly across production, processing and output activities.

**Key words**: agro-processing, regional industrialisation, labour, global value chains, soy, South Africa, Zambia, Zimbabwe

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1.0 Introduction into optimism in soy agro-processing

The substantial changes in agricultural production and processing associated with the commercialisation and commodification of agriculture have been the subject of extensive research and optimism in academic, policy and media circles. The rise of agricultural commodity prices in the 2000s, the shifts in agriculture towards value chain production, and the growth of private enterprise in food and non-food production have fuelled optimism about the role of agriculture in economic development. This growth and optimism have focused heavily on the supply constraints and upgrading into higher value added products, processes and markets. This research uses the case study of soy production and processing in Zambia, Zimbabwe and South Africa to highlight the challenges with the production and processing growth, the quest for upgrading through global value chains, and the optimism about agro-industrialisation. It is argued that the limited diversification, employment growth and the failure to develop linkages into other sectors or economic activities at the national and regional level reveal fundamental obstacles for industrialisation. These contributions echo the ideas put forward by Storm (2015, p.666) in Development and Change Vol 46 (4). They suggest the need for a shift away from conceptual and policy debates underpinned by market competitiveness and a return to a more structuralist approach, albeit, one based on “learning from past mistakes and taking into account new challenges posed by today’s global realities”.

The paper is structured as follows. Section 1 outlines the background to the optimism around the concept of agro-processing and the growth of the global soy market. Section 2 considers how the role of agriculture is currently portrayed in agricultural production-processing chains with supply-side constraints and value added at the core of understanding industry development. This section focuses on the limitations of value chain led agro-industrialisation and contrasts market-led frameworks with structuralist notions of industrialisation achieved through the formation of broad and cumulative economic linkages and increasing returns to scale. The third section presents evidence from a case study of soy production and processing across South Africa, Zambia and Zimbabwe. The fourth section draws attention to the limitations that the current patterns and theoretical conceptualisation place on possible regional or cross-border industrialisation. A regional focus seeks to move away from national supply and demand competition between businesses and instead explores what might make sector growth sustainable over a longer period of time and extend beyond a narrow sector or value adding chain of activities. This expanded approach draws on structuralist notions of industrialisation and considers the importance of linkages and spillovers, overcoming national limitations through regional collaboration, employment and consumption linkages and regional policy questions. The paper concludes on identifying the need to develop a more nuanced understanding of the power and class relations in the soy agro-processing industry. These raise new research questions about the policy and production choices that incorporate the missing labour perspective and push the analysis towards self-sustaining and balanced regional industry development.

“The prospects for continued growth in demand for value-added food and agricultural products constitute an incentive for increased attention to agro-industries development within the context of economic growth, food security and poverty-fighting strategies. Agro-industries, ... understood as a component of the manufacturing sector where value is added to agricultural raw materials through processing and handling operations, are known to be efficient engines of growth and development.” FAO & UNIDO (2009, p.1-2)

The FAO & UNIDO (2009) study quoted above begins with reference to three important observations on trends and debates around agro-industrialisation. First, at the core of this statement are the growing demand for food and non-food agricultural products and the trend towards increased consumption of livestock-based sources of protein. Secondly, the growing
demand and price growth has triggered a supply response which has focused attention onto increasing both agricultural production and processing. Thirdly, the prominent global value chain framework and underlying reliance on market competitiveness have shaped debates on the appropriate production and policy actions. The global value chain approach and underlying notions of improving market competitiveness has also influenced debates on the theoretical conceptualisation of agriculture in economic development. This has had important implications for our understanding of growth through agriculture and agro-processing. These production, policy and analytical developments have been particularly influential in debates on sub-Saharan Africa, where the proportion of economies structured around agriculture is high. Oya (2010, p.1) notes, using the Commission for Africa (2005) statement, that agriculture ‘contributed at least 40% of exports, 30% GDP, 30% of foreign exchange earnings and between 70-80% of employment in Sub-Saharan Africa. Oya (2010, p.1) also comment that the agricultural productivity and growth potential is preceded by several decades of what he terms Agro-Afro-pessimism about agriculture as the engine of development.

The growing importance of agriculture to economic growth, employment, exports and foreign exchange, together with the blurring boundaries between manufacturing and agriculture have been documented in various studies on African agro-business, agro-processing or agro-industrial growth. These have explored the different challenges and processes between sub-Saharan agro-industries seeking to move into higher value added markets and production. One significant observation is the difference between the performance of agriculture in comparison to the growth of agribusiness, measured through the contribution to GDP. The graph below highlights the growth of agribusiness in stark contrast with agriculture were the GDP contribution declines as GDP/capita rises (FAO & UNIDO, 2009, p.249). The potential longer-term industrialisation impact of this agribusiness growth sets the background for the discussion around regional development through soy processing.

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1 Agribusiness, agro-processing and agro-industry are often used interchangeably to refer to the type of business activities or enterprises involved in the input supply, transformation, storage, distribution and output markets from agricultural, fishery and forestry inputs. FAO define agro-industry to include the manufacture of food, beverages and tobacco, textiles and clothing, wood products and furniture, paper, paper products and printing, and rubber and rubber products, (FAO 1997 as in FAO & UNIDO 2009, p.11). Agribusiness is used to refer to processors, exporters and retailers typically positioned downstream from farmers and raw material producers (FAO & UNIDO 2009, p.188). Agro-processing is thus a subset of agribusiness activities. Agro-industry is seen as a subset of the broader agro-business concept which includes non-agricultural industries using agricultural inputs, the use of non-traditional inputs in agriculture and the blurring of sector or industry roles, technologies, processes or other distinctions between what have previously been termed as agricultural or non-agricultural activities. The shared characteristics include the use of perishable inputs, interaction determined by prices, profits and market structures and forces.

To provide further background to the agrarian optimism, a wealth of empirical literature points to the immediate and potential impact of increased agricultural production and demand growth especially in the higher value added activities. This optimism draws on perceptions of improved food security, human welfare, a positive impact on rural livelihoods, poverty reduction, promotion of environmental management, increased exports, and overall economic growth (FAO & UNIDO 2009, p. 252). The growth in demand and commodity prices, as well as the changing (output) composition of agricultural production also have given rise to new optimism about the potential for agriculture to drive economic development through commercialisation (agro-business), diversification, and capture of increased value-added products and markets. This ensuing agro-industrialisation is seen to emerge from a combination of demand-pull, commodity price growth, supply increases, as well as forward and backward linkages within the value chain, resulting in skill- and technology development, employment growth, export growth and diversification of output. The growth potential is associated with a shift towards agro-processing, that is the prioritisation of higher value added production and beneficiation of agricultural commodities. The growth effects are associated with direct production multiplier effects through input-output linkages where increased demand for processed products trickle down and trigger demand and price increases for raw or unprocessed products (inputs). Growth is also understood through diversification away from traditional agricultural commodities such as grains, fruit, fisheries and forestry products, and into: niche products such as cut flowers or essential oils; new markets based on information about production characteristics such as sustainable, organic, fair trade or ethical; or the development of new technologies and processes that enable the use of agricultural inputs in non-food industries such as biofuels, cosmetics, pharmaceuticals, paints and construction materials.

A widely cited framework by Reardon (2007) preceded by Reardon & Barrett (2000) seeks to explain the evolution of these agricultural trends and to describe the market-based conceptualisation of agro-industrialisation. The framework identifies the importance of connecting trends in agro-processing, conceptualised within individual production or value chains, with broader economic forces and factors. For example, the developing country agro-industries column singles out increasing capital intensity and concentration of production. It also highlights a connection between national, regional and global agricultural production whilst situating these within meta-trends or changes in the economic and policy environment. Likewise the multiple
dimensions, trends, influences and structural changes are also connected to broader development processes, identified through examples of key indicators. The diagram also reveals a key gap in understanding the mechanisms and processes by which the agricultural production and processing trends, situated within the meta-trends or the broader economic forces and obstacles, could translate to industrial deepening, diversification and development both within and beyond select sectors, value chains and agricultural industries.

![Diagram showing meta-trends, global agro-food economy changes, developing country agro-industries, and development indicators.](image)

Source: FAO & UNIDO (2009, p.14)

The gap, in conceptualising the mechanism by which production and processing growth in agriculture could translate into industrialisation, points to the need to explore the nature of agricultural growth in particular activities, and to the need to investigate how these trends could trigger a sustainable (long-term), cumulative and broad-based agricultural development across different economic activities and agents as well as across geographical boundaries such as national borders. Agro-processing is understood as focused on the short-term and on profit- and value-added-led growth in narrowly defined sectors. Activities within these sectors are connected within a particular input-output structure that provides the focal point for forces that drive the upgrading of products, processes, and functions. Upgrading is understood through the shift into new
markets, products, processes characterised by higher value added. This is conceptually very different from the type of industrialisation based on linkages and spillovers beyond specific sectors and across multiple economic agents and interests envisaged by the structuralist approaches.

The differences between the notions associated with agro-processing, upgrading, value-added and the cumulative broader notions around industrialisation based on multiple economic linkages are visible in debates about the appropriate industrial policies and support in sub-Saharan Africa. Recent academic and policy studies have highlighted the importance of understanding the nature, obstacles and prospects within particular value chains across various agricultural and mining commodities (Morris et al 2012, UNECA 2013). There has also been a revival of debates around the need for more nuanced and active industrial policy as evidenced by WIDER, Chang/FAO 2009, Arkebe (2015), UNIDO (2015), Cramer & Sender 2015 TIPS). The broader initiative by the government of the Republic of South Africa to investigate regional industrialisation in transport infrastructure, inputs to mining and the inputs to animal feed chains that provided the funding for this research during 2014-2015 is also evidence for a shift in policy interests. Engineering News, a South African online news source captures the optimism by quoting a Statistics South Africa estimate for agricultural growth 6%, much higher than the GDP growth of 1.5% (2014 estimate) alongside evidence of a positive supply response to increased (agricultural output) demand at the national and regional level (Engineering News 2015, “Glass half full”).

Though both the focus on and the growth of agricultural production is cause for optimism, the policy and media attention have been firmly rooted within a pro-market approach focused narrowly on specific input-output chains. The view presented rests on the perception that “the commercial agricultural sector adapted well to the policy reforms and liberalisation efforts, resulting in ‘an acceleration in the establishment of new enterprises in agriculture and downstream food processing sectors and foreign trade’ as the agricultural industry became ‘internationally more competitive’” (Sender 2015, p.9 quoting OECD 2005, 2013 Fifteen-Year Review for the Presidency). The importance of ‘competitiveness’ as the national industry driver is also revealed in South Africa’s competitiveness programme.

One of the challenges with using competitiveness as the measure for dynamic change is that it narrows the focus on individual enterprise or sector activity and measures success through prices or value added. This presents a number of conundrums. It may be theoretically desirable for individual enterprises to consider their short-term competitiveness (cover their marginal costs) in the short or medium term. However, scaling to the sector, industry or national level highlights the importance of diversification, innovation, learning and other constructive rather than restrictive sources of development. Firms do not set out to be the best at cost management but to offer services and goods at an appropriate price. Sources of profit and productivity growth require interaction between multiple enterprises. Furthermore, sectors, industries and national interests are not identical nor are the factor that determine the calculation of competitiveness, prices, sale volumes and value added, are affected by a range of factors, many beyond the control of individual enterprises or sectors. Prices and sales are affected by external economic events, structures and influences from other sectors, industries, and from factors arising beyond the national economic structure and setting.

2.0 Global and regional setting for soy production and processing

Investigating soy production and processing is interesting from a number of perspectives. Firstly, the observed growth trends in both supply and demand present the space to understand how a particular agricultural production chain is changing. Secondly, the potential scope for further development is aligned with the recognition that African economic development cannot be grounded in an approach that is national in focus, but instead requires the development of new
forms of collaboration in production, market development, and policy at multiple levels. Thirdly, the extent to which companies are willing and able to expand into activities that would help develop regional demand and supply (as opposed to firm or national) has been limited. This opens new questions for the development of a strategic regional industry and policy approach.

More specifically, soy production is of interest given the multiple roles it can occupy within agricultural production and processing. First, soy is a food crop that can be used for crop rotation to improve soil quality. Second, soybean production has been experiencing a demand-pull as a result of the growing consumption of poultry and through this, growing demand for animal feed. Soy is a core feed component given the high protein values and relative ease of processing into animal feed. Third, the potential growth in soy oil use through the increased production of soy-based food produce, and increased use by other industries such as cosmetics, pharmaceuticals and paint industry represents an area for further investigation. The potential growth in demand for sources of biofuel also represents an important area for further investigation. Fourth, soy is also of interest to producers given the price is not a sensitive to questions and debates of food security or regulated in the same way as other food grains such as maize. Producers are attracted to the possibility to grow soy alongside other food crops as well as the possibility to gain higher returns from growing prices.

“Soybean is the world’s most important, most traded oilseed. Processed, it is a source of high-quality, high-protein animal feed in the poultry and pork industries—and a source of edible oil. There is also a growing market for human consumption of processed soy, such as corn-soy blend, which offers a low-cost source of protein. “ ACET (2014, p.9) Other important oilseeds include sunflower, copra, rapeseed, palm kernel, cottonseed, peanut and fish oil. Soy accounts for over 50% of world oilseed and protein meal production. Global soybean and meal production have all experienced slightly over 4% CAGR between 1990-2010 and oil between 2000-2010.

The diagram below shows the activities and key stakeholders that constitute the soy processing value chain.

**Figure 2 Soy value chain and key stakeholders**

Source: Joubert (2011, p.118)
A breakdown of the sub-components of processing and key soy products is provided below. This showcases the range of parallel products that can be derived from soybean including animal feed, other food products, cosmetics, paint and other industries.

Figure 3 Soy value chain

Technoserve (2011) note that 1MT of soybean produces an estimate of 0.18MT of oil and 0.8MT of soybean cake. As the table/graph above show, the main demand for soybean arises from poultry (animal feed) with potential market growth opportunity in soy oil, food derivatives and biofuel. However, it is important to find a market for the oil by-product. This opens opportunities both in the development of soy-based food markets, soy-oil for human consumption as well as for other industry and biofuel development. Oil markets have been dominated by other grains (sunflower, palm, cotton, olive), and there is little or limited demand for soy oil as a cooking oil. The combination of strong demand growth and opportunities for alternative market development (especially in finding a market for the soy oil) represent important areas of potential and future development and contribute to the interest in researching soy.

2.1 Trends in soy production and processing

In addition to these market and product characteristics, trends in demand, prices and imports (especially for South Africa) highlight the importance of understanding the space for developing the national and regional soy chains. The gradual increase in prices has generated an interest in
soy bean production, the demand pull from animal feed producers and the growth of poultry has contributed to the interest in increasing soy bean production and processing.

Figure 4 World oilseed prices

![Graph: World oilseed prices](http://www.bfap.co.za/images/documents/baseline/bfap_baseline_2014.pdf)


More specifically, recent trends have captured the interests of producers, traders and policymakers alike. Notably, the increased demand for poultry which is driven by the growth and changing patterns of middle class food consumption can be seen with South Africa, Egypt and Morocco displaying the fastest global poultry production growth.

“Between 2000 and 2011, chicken meat production in Africa expanded by almost five per cent per year as output climbed to 4.62 million tonnes. As global growth during this period averaged a little below four per cent per year, Africa increased her contribution to the world total from 4.7 to 5.1 per cent (Table 1).” PoultrySite.com (2013)

As the table below shows, the global poultry market is dominated by the Americas. South Africa dominates African production with a growth in production from 818,700 tons of poultry in 2000 to 1,485,600 tons in 2011.
The growing poultry demand creates an increased need for animal feed. As the research into poultry by Bagopi et al (2014) shows, growth in the animal feed industry has been an important development linking poultry and soy production. Technoserve (2011) estimate that 37% of poultry production costs are associated with soy-based animal feed, in comparison with 20% of costs with maize-feed and 18% with other feed costs.

**Table 1. Indigenous chicken meat production (million tonnes)**

<table>
<thead>
<tr>
<th>Region</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012E</th>
<th>2013F</th>
<th>2014F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>2.8</td>
<td>3.4</td>
<td>3.7</td>
<td>4.0</td>
<td>4.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Americas</td>
<td>27.1</td>
<td>33.7</td>
<td>35.0</td>
<td>37.4</td>
<td>36.7</td>
<td>38.6</td>
</tr>
<tr>
<td>Asia</td>
<td>18.6</td>
<td>23.5</td>
<td>25.0</td>
<td>26.2</td>
<td>28.0</td>
<td>29.1</td>
</tr>
<tr>
<td>Europe</td>
<td>9.3</td>
<td>10.8</td>
<td>11.6</td>
<td>12.1</td>
<td>13.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Oceania</td>
<td>0.7</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

**Broiler meat production (million tonnes)**

<table>
<thead>
<tr>
<th>Region</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012E</th>
<th>2013F</th>
<th>2014F</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORLD</td>
<td>58.5</td>
<td>72.3</td>
<td>76.2</td>
<td>80.6</td>
<td>83.3</td>
<td>87.2</td>
</tr>
</tbody>
</table>

Source: thepoultrysite.com (2013)

This trend has been accompanied by rising soybean and soymeal prices. Initial responses to these market incentives or demand-pull effects have been seen in both production and processing. These responses are both contained and vary by the characteristics of the national value chains. For example, the supply response in Zambia has been characterized by an increase in soybean production. The South African response has been to increase investment into soy processing.
capacity (both single and shared grain processing). Zimbabwe continues to import both soy meal and oil but has old, albeit outdated, production and processing capacity that it seeks to upgrade.

World soy production is dominated by Brazil, Argentina and the United States. ACET (2014) estimates that 81% of production volume and 88% trade can be attributed to these three countries (2011 data). China and India are also important global producers of soybean with India, Argentina and Brazil displaying 37%, 225% and 18% growth in production between 2005-2010. Sub-Saharan Africa is estimated to produce 0.2% of global soybean output.

Figure 6 Trends of soy production and area harvested

![World Soybean Area Planted and Production Graph](image)

Source: NAMC (2011, p.18)

Global soybean processing is also captured by China, USA, Argentina, and Brazil (in order of largest downwards) accounting for 78% of processing in 2010/2011 (NAMC 2011). Soybean meal production has also experienced global growth as show in the graph below.

Figure 7 Trends of soy processing

![Soybean Meal Production Graph](image)

Source: NAMC (2011, p.19)

Soy oil production markets have also grown between 2000-2010 with further projected growth expected. Global soybean oil consumption increased at 4.7% between 1991-2010, on par with global soybean and soymeal consumption. Global soy oil exports from the top exporting countries by volume (in order USA, Brazil, Argentina, Paraguay and Canada) also grew at 5.6% between 2000-2010. However, these trends do not fully capture the developments in Southern Africa
where oil markets are affected by palm oil imports from Indonesia, internal exports from South African and Zambia into Zimbabwe and Malawi. NAMC (2011, p.61-63) compare demand projections based on historic demand, expected oil demand, degrees of import substitution, different scenarios of land reform and processing growth. They find that soymeal demand growth ranges from 4% (historic trend) to 11% (BFAP estimate) or 5.5% (TNS estimate). Projected growth based on soy oil demand is estimated at 0.56% (historical trend), 5.6% (BFAP estimate) or 13.9% (TNS estimate).

Figure 8 Trends of soy oil traded

![World soybean oil trade, stocks and prices](source)

The opportunities for SSA focus on developing local and regional production and value addition, finding new markets (e.g. for soy oil) and diversifying production, processing and consumption within the Southern African region. The advantages of existing production and processing, infrastructure, soil quality and appropriate rainfall present an important source of shared advantage to capture the regional (Southern African) soy market. At the same time, the volume and cost advantage of global producers presents a threat to developing regional markets. This is particularly important as South Africa and Zimbabwe already import from Latin America (Brazil, Argentina) and that the agricultural conditions and latitude are very similar in terms of soil quality, precipitation, solar radiation, ocean currents, evaporation rates and state of agricultural infrastructure. It is argued that a window of opportunity exists for Southern African countries to actively support and develop regional collaboration in order to strengthen their collective ability to produce locally.

The map below shows the area suitable to soybean production in Southern Africa.
2.2 Demand drivers

The demand-pull from growing and shifting food consumption patterns presents an important aspect and connects to the ongoing GDP growth in sub-Saharan Africa. As the World Bank (2013) pulse report notes that excluding South Africa the region grew by an average of 5.8% in 2012, 2.7% if South Africa is included – well above the global developing country average of 4.9%.
Resources together with agricultural growth, led by domestic demand and high commodity prices account for much of this growth. Agricultural development remains one of the primary sources of employment and channel of for poverty reduction and with a growing middle-class, domestic demand for food is predicted to grow with an increase in the shift from grains to animal-based protein such as poultry. Yet, despite this growth, according to the World Bank (2013) report, investment growth is relatively low at an estimate of 22% of GDP, and though stable, remains at levels comparable to India and China in the 1960s and 1970s.

These growth and diversification trends have important implications for agriculture producing animal feed components such as soya. Soy production and processing has attracted growing interest especially in South Africa, home to Sub-Saharan Africa’s dominant poultry producers. Consumption growth associated with a growing middle-class has also triggered increased soy production in Zambia. Soy production and processing presents an important opportunity for developing domestic food production with scope for developing and upgrading the soy-animal feed- poultry production chain. In addition to the potential for employment growth, increased domestic food production (and reduced imports), and poverty reduction, it present an opportunity for industrial development understood both narrowly as activities linked within an agro-processing chain as well as part of a broader multi-sector industrialisation involving a range of cumulative linkages across the economy.

Soy production and processing remains largely unregulated with the primary policy influences being indirect effects of general agricultural, food/phytosanitary, infrastructure or land policies. Trade policy is defined to target the import and export of soy products. However, other than imports (especially into South Africa), the trade volumes are very low and the tariffs imposed are not perceived to be a key developmental feature for the industry. What is of interest is the nature, extent and implications of these market and policy trends and the space that they create for further and potentially more longer-term intervention focused on the regional or collaborative supply and demand development.
Africa is estimated at less than 1% of global production and is a net importer. The main African producers and processors are South Africa at 861MT (2010 data) representing 65% of regional production and Nigeria (production only) with recent growth in Zambian production. Demand for the region is estimated at 2MT, with approximately 2/3 captured by South Africa (Technoserve 2011, p.3). It is estimated that demand will grow in South Africa, Zambia and Zimbabwe, affected in part by poultry feed demand growth, improvements in seed quality, improved weed and pest control, better access to information and farming techniques, increased land planted with soy resulting from a shift away from maize, and improved access to finance and other inputs through contract and other farming programmes. Critical issues around land reform, improving market infrastructure and linkages within the soy production-processing chain, and improved knowledge transfer schemes remain to be addressed.

The diagram below projects increases in demand for soybean across the Southern African region. It is important to consider that the main demand-pull is effected through soy meal (for animal feed processing). Soy oil demand in South Africa and Zimbabwe is low with the market preference for other oils. Palm oil imports from Indonesia into Zambia and Zimbabwe represent an important obstacle to developing the soy oil market.

**Figure 11 Soy demand projections**

<table>
<thead>
<tr>
<th></th>
<th>Projected demand*</th>
<th>Change in demand, 2010-2020, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>2,720</td>
<td>68</td>
</tr>
<tr>
<td>Zambia</td>
<td>194</td>
<td>140</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>272</td>
<td>64</td>
</tr>
<tr>
<td>Malawi</td>
<td>131</td>
<td>108</td>
</tr>
<tr>
<td>Mozambique</td>
<td>137</td>
<td>270</td>
</tr>
<tr>
<td>Angola</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>DRC</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>3,554</td>
<td></td>
</tr>
</tbody>
</table>

Source: Technoserve (2011, p.38)

The scope for industrial development is not restricted to the national level. Instead, soy production-processing presents an opportunity for greater regional collaboration or eventual regional industrialisation across national boundaries.

The study finds that despite impressive demand growth, investment into especially processing capacity, and the scope for the replacement of imports from outside sub-Saharan Africa (notably Latin America), national and regional development remains timid for a number of reasons. Firstly, each national value chain suffers from specific production obstacles, competition from other grains or other countries. Secondly, demand growth remains dependent on a concentrated poultry industry, and the animal feed industry in general, and limited investment into production and processing capacity. Thirdly, lack of information, mistrust, and absence of a strategic longer term space and impetus for collaboration arises from both the constraints set by infrastructure and limited existing production-collaboration as well as perceptions of continuity in South Africa’s historically dominant role whereby neighboring countries fear they may be confined to the lower end of a possible regional value chain. Fourthly, combination of limited policy support and the
short-term profit- (rather than investment-) led approach associated with firms prevents the emergence of forms of collaboration that could overcome fears of unequal division of gains as well as address the practical obstacles.

Each of the three countries soy industries stand to benefit from collaboration that leverages different production advantages, as well as from a greater integration of regional demand. The growth of regional supply capacity to meet the growing regional demand is unlikely to emerge from firm-level or market-led interaction. This creates the space for a targeted and shared regional industrial policy that seeks to support the formation and consolidation of regional demand and supply in lieu of imported inputs or outputs. It also seeks to foster greater cross-border collaboration between producers, processors and other industry stakeholders.
3.0 Conceptual framing of the study

This section introduces key issues from two different theoretical debates relevant to agricultural development and agro-industrialisation. These are the industrialisation through manufacturing, and agricultural development and agro-processing as a form of value chain development. The two areas of literature provide different conceptualisations of the nature and role of agriculture in industrialisation. Considering their characteristics draws out key limitations of agro-processing as a platform for industrialisation. Fundamental differences arise from the role allocated to competitive markets, connections or linkages between different economic activities, time-scale considered, and the policy implications. The evolution of thinking around accumulation through agriculture provides a useful starting point for the two core areas of debates around the nature and dynamics of industrial development in soy. It is also interesting to consider how debates around the agrarian questions and agricultural development have remained divorced from discussions (structuralist or other) of industrialisation. Despite the various associations and limitations of the underlying value chain approach, exploring agro-processing as a platform for industrial development does at least open the door to identifying areas of common interest.

The study of the soy value chain in terms of the national and regional aspects loosely employs the global value chain concept as the starting point for investigating agro-processing. The global value chain concept focuses on the relationships between firms connected by supply linkages with notions of upgrading (across dimensions as varied as production, value added, skills, technology, control etc.) and governance (e.g. nodes of control, lead firms, buyer- or supplier-driven) at the heart of the approach. The soy value chain consists of activities from the selection of appropriate seed and other inputs, farming to produce soy beans, to processing which involves crushing, extracting oil and producing cake which can then be further processed to animal feed, edible or industrial oil. Traders play an important part in linking production to different processing stages as well as the mediating access to intermediate or final markets. In addition, the physical and economic environment in terms of policy, infrastructure, land quality, trade patterns and agreements, access to credit, funding or investment also determine the parameters for the chain.

The literature views soy production and processing as an agriculture commodity chain, with potential for increasing returns to scale. In addition to being explored as an agro-processing or agro-industrial set of activities, there are other investigative angles arising from the variety of farming structures (e.g. smallholder, cooperative, traditional, commercial), tensions over land tenure and reforms, the implications for employment, and ultimately for poverty reduction, but also self-sufficiency at the individual, local, national and regional level. These are acknowledged but remain beyond the scope of this study. The initial review into questions of value chain agro-processing and agro-industrialisation raise a number of limitations and questions. These are important to understanding and developing regional supply and demand. For example, regarding employment, the space for developing multiple types of farming and for supporting linkages between different producers and processors provides scope for using soy farming as a primary or alternative source of employment alongside other farming or other sources of employment. For the individual, local and national level, questions of land tenure and linkages between production and processing are also important frameworks for debate. Finally, the regional aspect raises questions about the extent and relevance of national competition against neighboring countries, competition against dominant global producers and processors, and questions about the scope for market and production development at the regional level. This seeks to shift the focus away from the dominant ‘regional integration’ discourse around trade and trade liberalisation and instead could entail a focus on linked regional production to take advantage of the different supply capacities and demand development across countries in Southern Africa. It could also focus on replacing imports of inputs from global markets at different levels of the chain as a path to developing domestic and regional supply capacity. These alternative analytical angles, alongside specific differences in the individual country value chains, enabling environments, and the drivers
Traditionally seen as a source of food, surplus capital and labour, and demand for manufactured products, the scope for processing of agricultural commodities has created space for debates around agro-industrialisation where agricultural production and beneficiation can manifest tendencies associated with manufacturing as an engine for industrialisation such as increasing returns to scale, learning and technology improvements to improve productivity, and a greater contribution to growth through domestic and export markets. One of these recent debates has been around the processing of agricultural or other commodities as a source of accumulation, up- and downstream linkage formation, and access to markets (both domestic and export) in the higher value-added segment.³

The agricultural sector within the capitalist accumulation structure has been seen as the source of agricultural surplus in the form of food and non-food inputs, finance, and labour. Exploring the nature of and way in which this surplus is harnessed, the agrarian question, has been the subject of much debate (see special issue of Journal of Peasant Studies/Akram-Lodhi 1 and 2 and Journal of Agrarian Change for useful summaries). Bernstein (1996) in Akram-Lodhi and Kay (2010. P.255-256) groups these into three themes or what he calls problematics of accumulation, politics, and production that highlight different aspect of the agrarian question. Central to this literature are the struggles associated with the transformation of the production and reproduction of labour, underlying class tensions especially between capital owners and labour, understanding the evolution of the labour process, and understanding the political forces and forms that constrain and condition and are themselves shaped by the rural struggle. Akhram-Lodhi & Kay (2010b) argue that these different problematics, and their extensive sub-sections of debate and literature, converge around the emergence and transformation of agrarian capitalism. More specifically, this transformation rests on understanding the nature and forces by which the agricultural labour is commodified and agricultural production shifts from household use and reproduction to a process characterised by accumulation and exchange.⁴ Bernstein (2010) also notes that industrialisation is seen as one of the forms of capitalist accumulation, achieved through extracting the surplus value of labour through specialisation and increased productivity in agricultural production. These are associated with a shift from subsistence farming activities and towards a range of upstream and downstream production driven and shaped by the interests, activities and institutions that enable the accumulation of profit for capital. The relationship between agriculture and industry is thus the foundation of understanding the transformation of agriculture and the processes of industrialisation.

Storm (2016, p.681) summarises the importance of understanding the confluence of agricultural development and structuralist industrialisation: “industrialisation requires parallel, or prior, agricultural growth...agricultural labour productivity, food production and food security”. The neoclassical view saw the failure to get agricultural prices right and an urban bias at the heart of low agricultural productivity an pushed for a pro-market approach that would enable farmers to increase and improve production through technology and efficiency improvements, shifting into commercial crops, large scale production, and new (export) markets all driven by the goal of profit maximisation. In contrast to the neoclassical thinking, the structuralist approach conceived the role of agriculture in industrialisation through a balance between agriculture and industry, focusing on the “inter-sectoral terms of trade... mediated by the state, between the surplus-controlling landlords and peasants ... urban industrial capitalists and rural and urban workers... reflect(ing) a political-economy (and class-analysis) interpretation of food pricing” (Storm 2016, p.683).

³ See for example UNECA (2013) and Morris et al (2012)
⁴ Akhram-Lodhi and Kay (2010b, p.265) document 7 areas of debate around the agrarian question.
3.1 Industrialisation through manufacturing

The underlying theoretical framework behind the notions of industrialisation through manufacturing development draws on the structuralist school of thought. These provide insights into the ways in which agricultural processing can serve as the basis for industrial development. Classical political economy has viewed manufacturing as the engine of growth based on specific characteristics attributed to manufacturing activities and processes of sector development. These focus in particular on the empirically observed tendency to generate increasing returns to scale, the scope for learning by doing and technology acquisitions and development to increase productivity, that is, output per input provided. This is grounded in Kaldor’s three laws on industrialisation through manufacturing that maintain the observed relation between GDP growth and manufacturing output growth, Verdoorn’s Law whereby productivity growth in manufacturing is related to output growth (because of dynamic returns to scale), and the negative relation between labour productivity growth and employment growth in non-manufacturing sectors (Kaldor 1961). Kaldor’s growth laws thus provide the backdrop to the notion that growth is positively related to the growth of output and labour productivity in manufacturing as well as a structural shift towards employment in manufacturing because based on the negative relation between labour productivity growth and rate of employment growth in non-manufacturing (Wells and Thirlwall 2003).

Writing in the context of South Africa, Zalk (2014. p.4) notes that manufacturing is seen to generate increasing returns to scale at the firm or sector/cluster level, as well as through “economy-wide linkages and multipliers, as manufacturing draws in inputs from primary sectors, manufacturing itself and services, as well as generating forward linkages to the rest of the economy”. This is based on different knowledge, skills, technology levels and acquisition patterns/capabilities, as well as on different access to and usage of capital across sectors. Manufacturing activities are seen as qualitatively different from other economic activities in particular through their different adoption of technology, skill levels and development, but also in their ability to attract and employ capital. This is in contrast to the neoclassical assumptions about the homogeneity of economic sectors (in terms of their productivity changes or linkages to the economy), assumptions about perfect information and instantaneous and costless technology transfer/learning, as well as the constant or diminishing returns to scale that are associated with all sectors. Growth is thus according to the same pattern and countries are distinguished only in the position on the production function either due to different starting points (in capital and labour), path dependency, or more recently due to imperfections in information or institutions as debated with the information-theoretic approach (Stiglitz 1985, 2000, 2002) or New institutional Economics (North 1990, 1991).

Allowing for a special role and characteristics for manufacturing, structuralists look beyond levels of growth in aggregate output or growth of specific (manufacturing) sectors at the way in which this growth is generated. Manufacturing according to the structuralist literature engenders broad-based self-sustaining or cumulative growth based on the creation of linkages or interdependencies between different parts of the economy as well as the way in which externalities, spillovers, learning by doing, and technology innovation and adoption takes place in firms and sectors. Linkages can take the form of backward and forward linkages with connected sectors (such as inputs to production, or sectors in a value chain), but can also be demand linkages between unconnected sectors (such as through consumption), or fiscal linkages as proposed by Hirschman (1981). Structuralism also seeks to explore what is driving the growth not just from a supply-side view as is characteristic to microeconomic thinking, but looking at the demand pull, market size and scope for expansion, and the associated increased scope for specialisation (in skills, processes and technology) as the market size expands (Weiss 1988).
As identified by Amsden (1997, 2001), perceiving manufacturing activities as the site of cumulative increasing returns, and relaxing assumptions about the homogeneity and perfection of markets or information (i.e. instant technology adoption and learning), has implications for policy in terms of managing demand, coordinating investments across inter-related sectors and other linked activities, but also for developing an understanding of the network of productive relations. Again, these policy implications are in contrast with those proposed by neoclassical economics of the perfect or imperfect markets where market-facilitation or temporary market-correction is considered. This would include for example, reducing infrastructure constraints, improving access to markets by reducing barriers to trade, or improving the education base to improve the pool of skills to draw from, or liberalising capital markets to allow for free movement of capital as an indicator of profitability and source of business incentive. These insights are relevant in exploring the scope for development of soy processing as a form of manufacturing. This debate has been topical in the media and academic literature under the topic of agro-industrialisation or agro-processing.

3.2 Questioning agro-processing as a platform for industrialisation

Viewing manufacturing as the engine of growth through the unique structural characteristics and relations has implications for how the role of agriculture is conceptualised. The aim here is not to reproduce an extensive debate on the role of agriculture and relationship between agriculture and industry, but to consider how this has enabled a recent shift in the way in which agriculture conceptualised. The classic work by Lewis (1954) explored the contributions of agriculture to economic development through the provision of surplus labour and other agricultural inputs to manufacturing, consumption or demand for manufactured goods, and food provision for those employed in non-agricultural production. The Lewis model focused on abundant supply of labour and savings/industrial accumulation constraint. Within this thinking, the shift of labour from agriculture to manufacturing would not constrain agricultural surplus production because of the low marginal productivity in agriculture. This would not be possible in the full-employment equilibrium position maintained by the neoclassical school of thought where surplus labour would not be available. It has also been argued that labour productivity in subsistence sectors may not necessarily be zero or low and that losing labour to manufacturing may lead to a loss of output of the reserve wage of non-agricultural production is close to the average agricultural product (Karshenas 2001). Comparing performance in Asia (labour-abundance) and Africa (land-abundance) concluded that the labour productivity increases in Asia (through investment and new technologies) allowed for expanded employment in the non-agricultural sector without growth in inflation (Karshenas 2001). This would suggest, that the scope for increasing labour productivity and not the initial endowments are key to developing non-agricultural sectors and economic output as a whole. This challenges the neoclassical and Ricardian foundations of static comparative advantage and suggests that through careful policy and coordination, agricultural or industrial growth can be stimulated if not created. Returning back to debates development of agriculture and the scope for industrial growth through surplus generation, or development of labour productivity to enable industrial growth, present a range of open questions and policy issues.

One of these developments has been the growth of debates on agro-industrialisation or agro-processing, that is, the beneficiation of agricultural output, as an approach that could present industrialisation and growth opportunities similar to those associated with manufacturing development. For example Ouma & Whitfield (2012) note:

“Current discourses on agro-industrialisation are moving increasingly beyond the neo-Ricardian comparative advantage paradigm (Altenburg, 2006; Larsen et al., 2009; Webber and Labaste,
Experiences from Latin American and Asian countries suggest that the successful (re)making of agro-industries not only rests on comparative advantages such as cheap labour, natural resources and geographical proximity to final markets, but also requires the creation of competitive advantages (Reardon and Flores, 2006). Creating competitive advantages in turn requires the transformation of landscapes of disparate capabilities, organisational forms, inherited institutional frameworks and routines, and technological relations into a coordinated socio-economic system. Furthermore, constructing the linkages that ‘make industries work’ have to be made and remade in response to changes in local and international environments.” Ouma & Whitfield (2012, p.302)

The growing debate on agricultural beneficiation draws on processing of primary resources or commodities as a path to industrialisation. Cramer (1999) in an important paper on processing cashew nuts in Mozambique outlines a number of challenges to vertical diversification and argues that these cannot be confined to the issue of price. First, the paper suggests that barriers to entry into the developed country markets, and the structure world markets is such that developing countries are severely constrained in their ability to enter and compete (especially against multinational corporations). Second, it is argued that: “real complexities of manufacturing in such conditions outweigh the expected benefits of diversifying away from primary commodity production and export” (Cramer 1999, p.1249). The conditions include, power-cuts, shortages of key inputs, infrastructure constraints, weak firm organisation, in addition to process-related obstacles of input shortages, skill shortages, market information needs, limitations in management and processing knowledge and skills. The paper also cites sources of optimism from agricultural processing arising from employment creation, reduced price volatility, linkages, stimuli to investments in infrastructure. Evidence from Yeats (1991), and UNCTAD (1995) is put forward to suggest that the growth of food processing is of particular importance. Cramer concludes that these obstacles are not insurmountable, but require a contextualised set of policies and institutions that can address the limitations in skills, information, transaction costs due to weak domestic market structures and ‘competitive assets’ (latter proposed by Amsden 1997). Cramer (1999) goes on to explain how the price-focus, the privatisation, and export tariff liberalisation contributed to the decline in output and that the pressing constraints were political rather than technical or economic. He notes that the most pressing constraints are those internal to Mozambique, rather than world market conditions or process-related factors. Instead, of focusing on the price, the industry and policy focus should be on enhanced coordination and cooperation, for example to overcome fragmentation of output and branding, industry standards, and foster and stabilise connections between producers and processors, but also improving policy capacity and enforcement, alongside ways to mediate tensions arising within and between firms. These factors are not new, however, Cramer (1999) concludes that a focus on finding the right price and competing on level play neither allows for specific sector and country constraints to be explored or addressed.

3.3 Global Value Chains represent a narrowing of the industrial development focus

In line with the agro-processing debate, much of the recent literature has focused on the development and nature of global value chains with a particular focus on access to export markets, upgrading value added, and governance or power distribution within chains. Bernstein and Campling (2006) in discussing the reduction of analytical space with the shift from global commodity chain studies to global value chain studies, draw on the work of Gibbon and Ponte (2005) and note the rise in empirical studies across a range of commodities.

"Those studies involved fieldwork in producer countries and consumer countries of the following agricultural and horticultural commodities: citrus (South Africa, UK); cocoa (Ghana, Netherlands, Denmark); coffee (Kenya, Ethiopia, Tanzania, Uganda, Italy, USA); cotton (Tanzania, Zimbabwe,
UK), and fresh vegetables (Kenya, Tanzania). In addition, there was a study of clothing as a labour-intensive manufactured export from Mauritius and South Africa (hardly typical African countries, of course) and its consumption destinations in the UK, France, Sweden and Denmark (Gibbon and Ponte, 2005 pp. 95–6).” Bernstein & Campling 2005

Bernstein & Campling (2006), note that the rise of GVC studies has not been without challenge, notably for the limitations imposed by focusing attention on the implications of changing financial and industrial structures (as part of globalisation). This includes consideration of the implications of the rise in retail power as a result of concentration and corporate restructuring, characterizing chains as producer- or buyer-driven networks, the focus on economies of scale as a source of comparative advantage, the barriers to entry faced by developing country producers, and a need to understand how developing countries could upgrade ‘what they do’ and ‘how they do it’ in order to overcome the challenges set by the previous changes.

In a similar fashion, Ouma & Whitfield (2012) also document a number of empirical studies and the limitations faced by developing countries. They highlight the challenges posed by a proliferation of food safety and quality standards as barriers to entry, and cite Oya's (2010) observations about the relative underperformance of African agro-industrialisation in productivity and competitiveness. The divergent regional patterns give rise to three themes for Ouma & Whitfield (2012). These are first, the need to improve understanding of the specific capacities (entrepreneurial and technological) and organisational forms and networks, moving away from what is required to how to generate them. Second, a focus on the collaboration or coordination of state-industry and intra-industry relations considered necessary even when entrepreneurs are experienced. Third, the observation that calls for competitiveness and efficiency need not be at odds with the development of smallholder production, together with that noting the market forces within global value chains leading to new forms of rural stratification and uneven development as opposed to inclusiveness.

Among the vibrant debate about the theoretical constructs and applicability of GVC frameworks, the way in which labour is included is a highly debated area. Relegating labour to the role of cost and homogenous, replaceable input is challenged by a number of case studies. For example, Selwyn (2013) and Pegler et al. (2011) highlight the need to consider labour as a key source of value added, and that insertion into a value-chain (global or national) erodes both the ability to contribute to the production dynamism, as well as the distribution of returns back to labour.

At the heart lie the debates about the limitations of the GVC concept in assisting the development of an understanding or policy that would address the limitations set by a focus on prices, value and a focus on the firm as the unit of analysis (Newman 2013, Bair 2005, Palpacuer 2008). This neglects important questions of how GVC as a sector strategy can serve as a route to industrial development, and what the purpose of the industrial development is for. Global value chains guide development through questions of increasing processing and value added, reducing costs of production and processing, upgrading skills and technologies, accessing markets for inputs and outputs. Some argue this is a form of industrialisation with particular characteristics arising from the nature of the chain under focus (e.g. up or downstream, sources of upgrading either through increasing quantity of higher value added product, increasing value added through input cost management, or moving into the production of higher value added components of chain, increasing control of the chain, gaining access to new markets). Others argue that the focus on cost and firms neglects other key aspects of industrialisation including, employment creation but also linkage formation with other sectors or activities, consumption or demand pull effects, investing or supporting spillover effects into non-chain components. Policy focus is therefore reduced to addressing obstacles to upgrading, cost and revenue optimisation, and access to markets.
3.4 Political economy of agro-industrialisation: other areas of debate

Going beyond questions of industrialisation and agro-processing, a number of other areas of debate are connected with the question of agricultural development. A key debate focuses on the question of land reform and the role of agricultural development for employment, rural livelihoods in general, and for the continuity of diversified forms of farming integrated into national agricultural structures. There are important conflicting issues arising from commercial viability, questions of equity and justice, employment issues, and questions around addressing rural poverty to name a few. The purpose here is to highlight the importance of incorporating an understanding of land and employment questions into studies that otherwise focus on the interests of firms, commercial entities, or other embedded power structures. It is important to be conscious that land reform does not simply replace old forms of capital by market capital with little or no change in the power relations and emerging questions of labour fragmentation and rural livelihoods.

There is a broad literature exploring the specific challenges around land reform in each of the countries. See for example Cousins (2005), Moyo (2007), or Sender & Johnston (2004). Land tenure processes have numerous challenges. As Cousins (2005) notes, land reform programmes have been underfunded and post-transfer support is limited. Tenure reform is slow to change agricultural structures. There are problems with enforcing rights, power with traditional leaders in land administration, discretionary power with minister, limited gender equity changes, and legal structures are not successful in assisting people to acquire land or prevent evictions.

“In relation to South Africa, Bernstein (1996) suggests that the agrarian question is both extreme and exceptional. He argues that in the past the central place within the social and political order of white commercial farmer interests resulted in policies that promoted cheap agricultural labour, provided extensive subsidies and installed a bureaucratic regime to regulate production, distribution and trade in the interests of agricultural capital. The concentration, scale, and productive capacity of capitalist agriculture in South Africa is clear evidence that the agrarian question of capital has by now been resolved, via ‘accumulation from above’. Market liberalisation in the 1980’s eroded these ‘Prussian’ features to a certain extent (e.g. casualisation and outsourcing of labour supplies, and private forms of regulation within globalising agro-food regimes), but did not fundamentally alter the distribution of power and resources within the sector.” Cousins (2005, p.6)

Though these are not fully reflected in this study on soy, the tensions discussed reflect a stagnation and segmentation in the interests around agriculture. As Cousins (2005, p.6) continues: “(c)onservative policy stances are also influenced a somewhat stereotyped understandings of agricultural development promoted by both the commercial farming lobby and by agricultural economists, and embraced by many ANC policy makers.” These stereotypical views perceive commercial agriculture seen as real agriculture with subsistence, communal or small-scale either seen as successful because they are scaled down versions of market-based, large, profit-maximising, commercial agricultural entities. Alternatively small-scale farming is seen as inefficient, unproductive, damaging to environment, or holding back rural to urban migration to address problems of employment and livelihoods. Latter views see land reform as a welfare and are skeptical of the contribution of non-commercial forms of farming to agricultural growth.

“Against this perspective, a number of counter-arguments, with extensive supporting evidence, can be mounted, asserting (a) the social inefficiency of large scale commercial farming, in terms of land use in particular (Moyo 1995; Weiner 1988; Levin and Weiner 1997); and (b) the under-acknowledged productivity of communal area farming systems (McAllister 2000; Shackleton et al
2000; 2001).” Cousins (2005,p.6). Similarly, Sender & Johnston (2004) draw attention to the notion that an efficiency focus is biased towards the size of farmer and draws on mainstream theoretical literature that excludes important considerations around agricultural dynamisms and employment. These approaches are based on market distortions or missing markets that, once identified, can be resolved to take advantage of the abundant factor of production, assumed to be labour in African agriculture. Instead of size, or perceptions of cost-efficiency, Sender & Johnston (2004) argue that the focus should be on how agricultural enterprises generate technological dynamism, investment, contribute to exports and most importantly to wage employment. That land redistribution programmes are not evaluated in terms of their employment creation opportunities, nor do adjoining policies consider how to support employment opportunities, remains a key challenge for agro-industrialisation - given the presence of land reform processes in many African countries.

The scope for agro-industrialisation is set within the context of the challenges around employment creation, land use/tenure, and policy challenges in light of embedded commercial and political interest against social or equity goals such as employment creation or land redistribution. This provides the background to explore the Southern African soy value chain in more detail. It allows a focus on aspects that are not exclusively driven by prices or trade access. It seeks to explore how competition, demand-growth, and the characteristics of the individual industry components can help support other industries and diversification of local food production in general. The existing mistrust, disinterest or tension between national and regional interests is made worse by approaches that focus on upgrading to capture gains, accessing new markets, or developing national self-sufficiency in a particular area of growth. It is in understanding this space between the scope of agro-processing development and the policy requirements nationally and regionally that our study on soy positions itself.

These frameworks highlight important aspects of industry development and have led to the use of an approach here that draws on the need to understand the drivers and challenges, relations and tensions, and also the nature of the market trends and dynamics especially the responses to demand growth, obstacles to production and processing, trade dynamics and challenges and the form of competition and collaboration. To take the analysis to the next level and investigate the scope for industrialisation requires an in-depth investigation into the drivers of industrialisation, that is the cumulative and causally significant linkages that form outside of a vertically defined value or production chain and beyond mechanisms that rely primarily on the developments and upgrading within and between firms. This would include a focus on linkages other than those that fit in the backwards-forwards description such as consumption, employment, fiscal, but also externalities in technology, learning, and demand and supply effects into other agricultural activities as well as other industries. These theoretical concerns and debates are acknowledged, and where relevant, the investigation has sought to incorporate aspects relevant to industrialisation more broadly. Though it is beyond the scope of the study to do justice to this type of exploration, it does enable an investigation into the development of a broader research plan that would expand to include questions on how soy production-processing into animal feed and poultry could constitute a space for broader industrialisation and what other aspects of the soy industry and environment are relevant. These issues are raised again under further research.

The theoretical discourses do not fully address the gaps in understanding the mechanisms by which a combination of demand and supply growth, or an increase in agro-processing, in the short term, can translate into a longer-term and self-sustaining pattern of agro-industrialisation. Open questions remain including: the focus on narrowly define chains within sectors, the importance allocated to prices and value added, the restricted notion of upgrading rooted in capture of value between firms/enterprises, and the limited approach to understanding power and tensions through governance. Delving into this conceptual gap and using evidence from the soy value chain,
this paper shows the absence of structural change, the concentration of capital and power in the hands of processors and traders, the emphasis on prices and costs and a short-term time focus. These factors combine to produce a set of conditions where the formation of broader linkages to support industrial deepening and diversification in the structuralist sense is absent or restricted. The evidence suggests that instead of challenging there is a consolidation or narrowing of the existing power and accumulation structures reflected by the ongoing dominance of processors and the absence of employment creation. At the regional level, tensions and power struggles are revealed in the policies and and mistrust regarding regional collaboration between the countries under focus.
4.0 Comparison of the South African, Zimbabwean and Zambian Soy Value Chains

This section draws on the literature and fieldwork findings to highlight the differences and similarities in the different national soy processing chains. The appendix contains the individual country summaries. At a broad level, the main findings can be summarised as follows. **The challenges in production, processing and trade or access to market are very different across the three countries under investigation.** Each of the production chains under focus has a distinctly national character with very little cross-border activity beyond trade in inputs. There is evidence of **very limited regional collaboration or integration** beyond purchase of inputs that were not available in domestic markets. Nevertheless, the research identified scope for greater collaboration across the industry and also in the harmonisation of national policy or development of regional policy frameworks for collaboration.

1. The challenges in production, processing and trade or access to market are very different across the three countries under investigation.
   - South Africa has access to inputs and large-scale commercial farming but struggles with insufficient production due to poor soil quality, competition from other crops and the limited ability and willingness to upscale supply given the transformation of agricultural structure, land tensions and competition from low-cost imported bean and meal. Prior limitations in dedicated soy processing capacity have been addressed, but overcapacity and infrastructure challenges such transport, and electricity supply remain ongoing issues. Exports are limited but finding a domestic or regional market for the soy oil is, and leveraging soy as a source of biofuel are key questions for future industry development.
   - Zambia has been able to scale up production given the variation in agricultural structures and substantial component of small- and medium-size farming. Linking smaller producers with larger ones or to processors has not presented a substantial obstacle. Information, technical knowhow and access to physical inputs especially regarding appropriate soil treatment, fertilisers, and best agricultural practices remain challenges alongside access to funding (especially for smallholder farmers). Transport network upgrades and transport costs also remain issues for access to market. Excess processing capacity has also not generated a sufficiently large demand-pull, in part due to import competition on the soy oil. The growth of Zambian soybean and meal supply in conjunction with the development of the domestic poultry and other animal industry remain important areas of future development for both the domestic and regional market.
   - Zimbabwe remains constrained by the supply shocks related to political tensions in general and in particular regarding land tenure contestation. Production capacity is low, equipment and inputs are outdated or not available at appropriate prices, funding and other support (information on and updating agricultural practices, market access, developing linkages between producers and processors) remain challenges and re-developing the domestic market in light of imports from the region (including Zambia and South Africa) as well as from outside are important obstacles. Yet, Zimbabwe presents two key opportunities that affect the region. The potential to develop the domestic market in terms of supply and demand presents an important opportunity for trade between Zimbabwe and regional partners. This is particularly important in light of the scope for developing the soy oil market. Zambia is a transport hub given its important location between Zambia and South Africa but also proximity to Mozambique and Malawi – both displaying potential for the soy oil and meal market. Zambian own production capacity is potentially significant given the high soil quality and varied structure of agricultural production (across small-, medium-, and large commercial farming).
   - The differences in the challenges and assets as well as the potential for supply and demand development suggests there is an opportunity for cross-border gains if these differences are leveraged in a strategic and inclusive manner. There is potential for shared
production within a regional value chain, but also for each national industry to develop in parallel with the advantages provided by greater interaction with neighboring national production networks. This would require careful collaboration across the industry and policy to ensure that the advantages and benefits are accessed and distributed in a manner that is both perceived to be mutually beneficial and address the need for long-term development. Given current policy is primarily focused on trade, this presents an important opportunity for developing policies to support key areas of supply and demand across the three countries. This may include elements of a regional import substitution strategy partially or selectively controlling imports of beans, meal or oil from outside SSA to enable the industry to leverage the cross-border advantages and address obstacles.

2. Each of the production chains under focus has a distinctly national character with very little cross-border activity beyond trade in inputs (fertiliser, soy beans) and some outputs (soy oil, soy-cake or full-fat meal). Most of the trade is in meal and oil from Zambia to Zimbabwe, oil and farm inputs (fertiliser, inoculants) from South Africa to Zimbabwe. There was evidence of small amounts of trade in beans and soymeal from Zambia to South Africa. The participants within the national value chains, production or processing, generally recognized the advantages of increased trade but pointed to parallel development and competition between national value chains to capture national production, transport and border infrastructure deficiencies and costs, and a general desire to consolidate capture of the higher value-added ends of the production-processing chain before seeking outside markets in the region. Processing firms in particular seemed content to purchase input (beans or meal) from the lowest cost providers, thus prioritizing imports from Latin America. This reflected a focus on their individual and immediate needs as firms, and their perception of neighbours as competitors or potential markets to access. This view prevailed even in cases where awareness of the potential growth opportunities from developing a regional demand and supply market (across Zambia, Zimbabwe, and South Africa) at the expense of favouring imports from outside the region.

3. There is evidence of very limited regional collaboration or integration beyond purchase of inputs that were not available in domestic markets (e.g. fertiliser, inoculants, farming equipment, beans or soymeal). Nevertheless, the research identified scope for greater collaboration across the industry and also in the harmonisation of national policy or development of regional policy frameworks for collaboration. These included:
   • Exploration of sources and nature of incoming palm oil that is entering COMESA and a parallel investigation into the development of the soy oil market regionally. Currently, there is some demand for soy oil in Zimbabwe, Malawi and Mozambique.
   • Tariff harmonisation to promote use of regional beans even if not produced in same location as processing units, to counter the low-cost and high volume competition from imports originating from outside the region. This is particularly important for South Africa, but unless production increases in Zambia and Zimbabwe are substantial, import competition is likely to grow in these countries as well. The joint tariffs would apply to imported beans and soymeal, but could also be extended to protect further processing to allow the regional production increases to emerge and consolidate.
   • Improving shared market development requires further attention to the facilitation and cost reduction of cross-country transport and border crossing.
   • Shared market development needs to address the tension between the GMO-based production in South Africa and the GMO-restrictions for production and trade that apply to Zambia and Zimbabwe.
   • Exploration of the scope for development both shared biofuel production as well as shared regional biofuel strategy.
   • Overcome entrenched views that national firms and value chains must compete with each
other, both within and across borders, in order to grow. This is connected to fears about the dominant and large South African enterprises capturing the high value-added end of the relatively smaller and less advanced Zimbabwean and Zambian soy production and processing chains. This also requires a shift away from the dominant positions held by processors in contrast with producers, and further up the value chain by animal feed manufacturers and the poultry (or other livestock) industry over soy producers-processors.\(^5\)

- One of the paths to shift the balance of power away from the high value-added animal feed and poultry industries is to develop other soy-based products for example in soy-derived food products, cosmetics, pharmaceuticals and biofuel as above.

The discussion focuses on the following aspects under investigation.

- **nature**, obstacles and opportunities of production and processing chain (structure, inputs, products, markets, competition, concentration, constraints)
- **trends** in trade, prices, competition, investment, and the drivers of supply and demand
- **relations** within the national value chains as well as with outside stakeholders and partners or interested parties (limited labour development)
- **environment** (policy, infrastructure, markets, competition)
- (dis)/interest and **scope for regional development**

### 4.1 Nature of production and processing

This section summarises the production, processing and input access, looking at the following aspects: structure in terms of production structure, concentration, vertical integration, inputs and the market, yields, processing structure and characteristics, and an overview of supply and demand within and across the three countries.

Soy production and processing across the three countries is driven by the role of soymeal as a primary component of animal feed. The production chain from soybean to oil and meal is portrayed in the picture below. Working from left to right, the soybean (jar1) is first crushed and de-husked (jar 2) to produce full-fat meal (jar 3). This is then processed using a solvent extraction method to produce soymeal (jar 4) and soy oil (jar 5). Side products such as lecithin and soy oil are captured for other uses with only ~1-2% of the entire bean content lost as waste. Lecithin is used in health foods and cosmetics. Soy oil can be used for cooking, other food derivatives but also in cosmetics, pharmaceuticals and paints.

**Figure 12 Soy production-processing outputs**

\(^5\) Over 80% of soy production in all the countries goes to the production of animal feed.
Production structure and yields

Production in South Africa is concentrated and led by large commercial farms. Anecdotal evidence suggests only 0.5% of production is with smallholder farmers (Technoserve 2011, Fieldwork interviews). The South Africa fieldwork produced an estimate of 3115 producers of soya beans, of which ~100 are small farmers. Commercial farming in South Africa is further categorized in to white commercial farmers, emerging commercial farms, corporate farming business (domestic or foreign-owned), and government-owned farms (USSEC 2011). Zambia and Zimbabwe have a more varied production structure with a substantial number of smallholder and medium-sized farms as well as large commercial farms. For Zimbabwe, smallholder farmers contribute to 2% of production and 65% of production is from large-scale farmers. In Zimbabwe, smallholder contract farmers are classified as 0.5-1Ha, medium-sized farmers at 50-60Ha, and the large farms at 500-600Ha per farmer. Technoserve (2011) estimated that 80% of farmers in Zambia are smallholder/household farmers and only 20% are commercial farmers. The 2011 study also revealed that soy was the fifth crop produced in Zambia after Maize, cassava, Tobacco, and groundnuts. However, the interviews indicate that soy farming is dominated by commercial farmers in all three countries under investigation. Soy production competes with food crops such as maize as well as with other oilseeds such as sunflower, cotton, canola and groundnuts.

The literature suggests that yield levels vary by production size. Technoserve (2011) estimates that only some of the commercial farmers are consistently able to keep yields at 3MT/ Ha, and feedback from farmers suggests that soya is tricky to make profitable given cost of labour and fluctuations in yields, cost-price structures, and storage and transport. In South Africa, the highest yields are achieved in Mpumalanga. NAMC (2011) estimate production of 183,250 tons in 2011 represented 46% of total production, DAFF (2013) estimates 2011 production in Mpumalanga at 294,500 tons, amounting to 41.5% of total production.

The table and figure below describe production yields across the three countries and showcase the slight increase between the literature based on findings up to 2010 and the fieldwork based on 2014 estimates. Attention is drawn to Zambian smallholder farmers’ ability to generate higher yields compared to the South African and Zimbabwean smallholder farmers. South Africa leads the yield tables for commercial farmers. Though South African commercial producers have the current advantage, their ability to scale up production and the challenges associated with the poorer soil quality present important policy questions. In contrast the evidence of high yields and ability to increase production in Zambia draws on the more diverse production structure – in particular the large numbers of small and medium-sized farmers. The research found that Zambia has very high quality land and very very good water access (rainfall). Conditions for soy production were considered most arable across Southern Africa, with the Central, Lusaka, Copperbelt and Southern areas especially suitable. Zimbabwe had very good rain conditions and majority of the land suitable for soy production. South Africa was considered least suited with only 12% of the surface area appropriate for crop production. Only 22% of this was high potential soil with water shortages adding to the cost of production in South Africa.

Technoserve (2011, p.50) estimate 200,000 smallholder soy farmers across the three countries and project an increase to 400,000. Observations from the literature and interviews suggest that this increase in small or medium-sized soy farms is predicted to be in Zambia and Zimbabwe. South Africa has approximately 5115 small farmers in total. Growth of small scale farming is hampered by the lack of appropriate agricultural structures such as marketing boards, difficulties in accessing markets/finance/inputs and the higher costs of production due to soil and water restrictions. Technoserve (2011) estimates that 98% of South African, 85% of Zambian, and 65% of Zimbabwean soy output was from commercial farmers. The scope for increasing production for the region not only rests on the ability to support production increases through smaller farmers.
but also on making available the inputs, information and technology that allow commercial farmers to achieve higher yields at lower costs. This presents an important policy option for South Africa where agricultural finance, input, information and technology are well established. South Africa’s support role is emphasised by the dominance of South African enterprises in the provision of seeds, fertiliser, inoculants and pesticides to the region.

Table 1 Yield comparison by country and farm size

<table>
<thead>
<tr>
<th>Yield comparison</th>
<th>Zimbabwe</th>
<th>Zambia</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large commercial farmers</td>
<td>Large-scale commercial farmers produced at 2.3mt/ha in 2001/2. Since then yields have range between 0.67 MT/ha and 1.4 MT/ha between the 2001/02 and 2013/14 seasons. Fieldwork estimates yields of maximum 4MT/Ha</td>
<td>2.78mt/ha estimate for 2013</td>
<td>The highest average yields are recorded in the Northern Cape at 3.2mt/ha. Mpumalanga, the site of highest production volumes records yields at 1.8mt/ha (2011 est.) Updated estimates from DAFF (2013) estimate yields at 1.7-2MT/ha.</td>
</tr>
<tr>
<td>Smaller farmers</td>
<td>0.67mt/ha 2001-2 to 1.4mt/ha in 2013/14 for smaller farmers. Fieldwork estimates confirm yields of 2MT/Ha (2014).</td>
<td>0.83 mt/ha</td>
<td>Technoserve (2011) estimate smallholder farmers yield is 0.8 mt/Ha.</td>
</tr>
</tbody>
</table>

Source: Interviews and literature review (see Desktop Soy Background Study 2014).

These yield findings concur with estimates from NAMC (2011) and Technoserve (2011) with yields for different size farms in between 2000-2010. These are shown below.
Inputs: challenges and costs

Inputs such as seeds, fertiliser, inoculants, irrigation, finance and labour provide a source of differentiation across the three countries. Input supply is relatively concentrated with a few large players operating across the region. Most of these are of South African or US origin and access to inputs is easier (in terms of knowledge, availability, and cost) for large commercial farmers and easier for South African farmers than counterparts in Zambia and Zimbabwe. Input access and payment for inputs is a key challenge to producers in Zimbabwe and Zambia. There are some contract arrangements whereby vertically integrated processors and traders provide inputs to farmers in return for payment in soybeans after the harvest. For example, in Zimbabwe, Olivine (oil processor) provides 80 communal farmers $250 worth of inputs and additional training. Likewise, Windmill offers 150-180day credit for fertiliser (Windmill is diversified across stock feed manufacture and fertiliser). Some traders also provide farmers with seed, fertiliser, and chemicals (inoculants, pesticides). For example, PHI Commodities a trader part of the Innscor Group that includes major players National Foods (stock feed), Irvine’s (poultry) and Colcom (pig processor). Typical input arrangements also include finance for machinery purchase, working capital (Staywell), or subcontracting between major players. For example, Kurima Gold manages contracts for National Foods with finance from PHI Commodities. These arrangements highlight the concentration in the processing and input segments of the value chain.

Remaining costs and risks borne by the farmers include electricity, water access (for irrigation), training and information, access to farming technology/machinery, but also competition between tobacco and maize (Zimbabwe). Tensions between producers and processors also arise from variation in yields and cost of production. Processors seek low cost, easily accessible input. Producers, in particular small-scale farmers, may not have the appropriate inputs, knowledge or technology to increase yields or to lower costs. This difference of interests and risks is especially important in light of import competition. Finance and input providers also note the risks associated with contracting small-scale farmers. The Zambian Commercial Farmers Union confirmed that low yields were an ongoing challenge alongside access to funding and the high cost of production.

Production structure and input access both influence yields with differences between the three
countries and by size of farm. Estimates from the literature on developments between 2000-2010 show that both South Africa and Zambia substantially increased the area under production, and thus the output. For example, Technoserve (2011, p.13) indicate an increase of 282% in SA production, and 315% increase for Zambian production. Van der Merwe et al (2013) confirm that there was an increase from 137,000ton to 650,000tons in the last decade. The area of soy planted in South Africa exceeded sunflower in 2012. Van der Merwe et al (2013) also note that the increase in production can be connected to the use of higher yield seed varieties. This was confirmed by interviews in South Africa (e.g. interview PR October 2014).

Other challenges that affect yields arise from the cyclical nature of production. Growth takes place only part of the season, seed demand varies depending on how much seed farmers put aside as well as the excess soybean not processed or meal that was not absorbed by the domestic or export markets. Storage capacity, competition from other grains at the production and processing stages, trade access and prices all play an important role in reinforcing the uncertainty and unpredictability of future production and processing decisions. Time is an important component also for inputs. Chemicals (inoculants and fertiliser) have a shelf life (typically of 2 years) and are affected by exchange rate fluctuations. Weather and rain patterns affect prices and output. Weather and output in other areas (the US and Latin America) also contribute to price fluctuations as well as to the availability and price of imports (especially important for South Africa).

Low investment together with the challenges of accessing finance or the high cost of finance result in low levels of production, low yields, and increase the need to import beans, meal and oil. This is particularly the case for Zimbabwe where production has declined rapidly as a result of uncertainty and tensions associated with the land reform programme. Investment or finance is required for infrastructure maintenance or upgrading, especially regarding the old irrigation and general equipment, but also to access inputs such as seed, fertiliser, inoculants, as well as to ensure backup supply of electricity or cover transport and storage costs. Access to finance/capital is also a challenge for processors as the extraction of oil and crushing into soymeal is capital intensive. Processors and traders also require funds to cover storage costs.

Different sources of funding were available for Zimbabwean producers and processors. Producer funding included contract farming, private sector credit, and international organisations and funders. There was evidence that some companies have been able to access funding from local banks though this was expensive. Shareholder equity or internal company financing were also cited. Small-scale farmers do not have reliable or regular access to private or company funding. Government funding for farmers was channelled through the Grain Marketing Board (often in the form of contract farming). For stock feed manufacturers, funding was available from traders on 60-day credit facilities, or 90-day consignment credits for foreign-owned franchises. Some companies noted funding from the Africa Enterprise Challenge Fund, IDC of South Africa.

Funding in the Zambian industry confirmed views of the literature to be focused on large commercial farming. Small-scale farmers were considered too high risk. The Community Markets for Conservation (COMACO), a non-profit organisation that produces soy products manufactured in Zambia aims to promote sustainability and environmental protection. They award farmers for good agronomic practices through price incentives. They offer smallholder farmers loans for their inputs that they have to repay. The farmers are encouraged to sell their produce to COMACO (Lubungu, Burke and Sitko, 2013). Cargill and Dunavant, cotton traders, encourages soy rotation for the farmers that grow cotton. Cargill provides seed, inoculant and fertiliser on loan, repaid at harvest through cash re-payment or cotton revenue. Dunavant also lends farmers inputs, but do not insist that soy products are sold exclusively to them.

In South Africa, commercial funding is available from LandBank and FNB. Some processors are vertically integrated or support farming with repeat contracts.
Table 2 Overlap of input sources

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Zimbabwe key players</th>
<th>Zambia key players</th>
<th>South Africa key players</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds</td>
<td>Seed-Co, Pannar, Agriseeds and Arda Seeds, Reapers</td>
<td>Seed-Co, Zamseed, Foreign Seed providers, ATS Agrochemicals, Omnia, ATS Agrochemicals</td>
<td>Pannar, Pioneed Seed, Link Seed</td>
</tr>
</tbody>
</table>
| Fertiliser, chemicals, inoculants | ZFC, Windmill, Omnia, Agricura                                                      | All chemicals are imported. ATS Agrochemicals (fungicides, pesticides, insecticides), Omnia, ATS, and foreign fertiliser companies provide soil testing to customers.  
6 | Fertiliser: Foskor, Omnia Fertilizer, Sasol Nitro, Yara SA, Profert Inoculant: Stimulant, Soygro Lime: Grasland Ondernemings, SA Lime and Gypsum Herbicide and pesticide: Syngenta, Efkto |
| Finance           | Non-bank finance account for 24%, bank finance 15% of credit sources. Finance accounts for 9% of variable cost. Access to finance major challenge for smallholder farmers with no or limited collateral such as land. Contract farmers receive inputs and finance from vertically integrated processors, traders and fertiliser companies. Zamseed offers commercial farmers payment plans for seeds purchased. This is not available for smallholder farmers. | The Industrial Development Corporation was noted as a key investor into processing capacity – jointly with existing processors. Standard agricultural finance was available through Land Bank and FNB though access requirements for smallholder farms were considered restrictive. |

Source: Fieldwork and Desktop reports

Production
The graphs and tables below show the actual and projected increase in production of soybean for South Africa, Zambia and Zimbabwe. In South Africa, data obtained from Mr W. Mokgobu – Daff 2014 and Dlamini, et al. (2014) provided a total production value for 2013/2014 as 944,340 tons. This is well below the demand of 1,990,000t estimated by Grain SA for 2015.

6 Soybeans require on average 10-12 different chemicals. Price of chemicals contribute 20% of total cost of production. Weeds are the main obstacle and can destroy up to 50% of the crop. Fertiliser was estimated to account for 40-45% of soybean production cost (less than for maize est. 50% of total cost).
Rapid production increases were seen in Zambia between 2000-2010 as shown below. The fieldwork found estimates for 2013 suggesting that small-scale farmers produced 36,756mt of soybeans and large scale or commercial farmers produced 224,307mt and that Soy production has increased from about 60 – 70,000mt in 2010 to over 200,000mt in 2013. Given the importance of smallholder farming in Zambian agricultural production, and the dominance of commercial farmers in soy production, there is scope for increased soy output with appropriate support for smallholder farmers.

**Figure 15 Zambian soy production trends**

<table>
<thead>
<tr>
<th>Province</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>942</td>
<td>1,387</td>
<td>2,384</td>
<td>3,557</td>
<td>4,318</td>
<td>4,860</td>
<td>1,431</td>
<td>4,809</td>
<td>10,629</td>
<td>6,929</td>
</tr>
<tr>
<td>Copperbelt</td>
<td>61</td>
<td>355</td>
<td>191</td>
<td>441</td>
<td>263</td>
<td>280</td>
<td>174</td>
<td>388</td>
<td>1,195</td>
<td>183</td>
</tr>
<tr>
<td>Eastern</td>
<td>3,542</td>
<td>2,258</td>
<td>2,281</td>
<td>3,316</td>
<td>8,877</td>
<td>5,496</td>
<td>5,128</td>
<td>6,695</td>
<td>7,847</td>
<td>7,260</td>
</tr>
<tr>
<td>Luapula</td>
<td>73</td>
<td>39</td>
<td>72</td>
<td>42</td>
<td>158</td>
<td>201</td>
<td>159</td>
<td>252</td>
<td>166</td>
<td>90</td>
</tr>
<tr>
<td>Lusaka</td>
<td>38</td>
<td>41</td>
<td>171</td>
<td>461</td>
<td>161</td>
<td>27</td>
<td>149</td>
<td>107</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td>1,092</td>
<td>1,015</td>
<td>2,551</td>
<td>2,901</td>
<td>4,405</td>
<td>1,769</td>
<td>1,808</td>
<td>2,640</td>
<td>5,095</td>
<td>2,144</td>
</tr>
<tr>
<td>N. Western</td>
<td>84</td>
<td>106</td>
<td>28</td>
<td>102</td>
<td>313</td>
<td>263</td>
<td>549</td>
<td>613</td>
<td>549</td>
<td></td>
</tr>
<tr>
<td>Southern</td>
<td>11</td>
<td>15</td>
<td>95</td>
<td>201</td>
<td>40</td>
<td>35</td>
<td>41</td>
<td>392</td>
<td>474</td>
<td>1,081</td>
</tr>
<tr>
<td>Western</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>32</td>
<td>29</td>
<td>17</td>
<td>11</td>
<td>39</td>
<td>92</td>
</tr>
</tbody>
</table>

**All Zambia**  5,818  5,147  7,721  8,477  18,656  13,144  9,148  15,885  26,165  18,510

Zimbabwean production has gradually increased but the country remains a net importer of GMO free soya beans. Zimbabwean production slumped after 2000 with both output and yields declining. In 2013, production was at est. 76, 933mt, down from the peak of 150,000 in 2000, though showing some gradual recovery. AIAS researchers estimated trends in output, yields and area planted as follows.

**Figure 16 Zimbabwe soy area planted, yield and output**

![Graph showing trends in area planted, yield, and output for Zimbabwe's soybean production from 1980 to 2014.](image)

Source: Zimstat (produced by AIAS for desktop report)

**Crushing and processing**

Processing can be in the form of solvent or mechanical extraction and can cover dual produce or single crop processing. Processing can also be split into human and animal as well as fullfat and soymeal (where the oil and fat has been removed). Processing is concentrated in all of the three countries. The Zimbabwean market is characterized by oil expressers (Olivine, Pure Oils, United Refineries and Surface Investments) and stock feed manufacturers (National Foods Agricfoods, Profeeds, Capital Foods, Feedmix, Fivet, Windmill, ABS Feeds, Triple C, Novatek along with some smaller players). 4 main crushing/processing companies account for 89% of the edible oil market (cottonseed and soybean) in Zimbabwe. There is similar concentration in the animal feed sector where 4 main manufacturers control over 50% of Zimbabwean market. There is some vertical integration with for example National Foods in both processing and stockfeed (Zimbabwe) and Windmill Ltd a fertiliser provider diversifying into contract farming, trading and processing of grains and distribution of oilseeds. Only 63 percent of Zimbabwe’s installed oilseed processing capacity is currently utilised apparently due to input constraints, obsolete technology, high costs of capital (credit), high cost of raw materials, energy and labour, and limited government support (especially for R&D and quality control) (CZI 2014; FAO 2012).

Six main processing companies were identified in Zambia: Novatek, Nutrifeeds, Zamanita, Tiger Animal Feeds, Quality Commodities, AgriOptions. The fieldwork focused on three main solvent extractors: Mount Meru, Zamanita and Emman. Crushing and soy processing is very concentrated with Zamanita (owned by Zambeef) vertically intergrated across production and processing as well as outsourcing. In Zambia, inputs are sourced from both commercial and large farmers as well as smaller farmers. For example, Novatek, owned by Zamanita, produces stock feed and maintains a list of small-scale suppliers. It is interesting to note the ownership overlap within and between Zambian and Zimbabwean processors as well as the cross-ownership with South Africa poultry producers (e.g. Novatek and Zamanita owned by Zambeef). The concentration of the poultry industry across Southern African countries has been noted elsewhere (Bagopi et al, 2014)

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7 In February 2015, Zambeef announced the sale of Zamanita to Cargill.
In South Africa, processing is concentrated with 10 main enterprises located primarily in the Gauteng/Mpumalanga/KZN triangle. The main processors and their processing capacity in 2011 and 2014 are shown below.

**Table 3 Processing categories in South Africa**

<table>
<thead>
<tr>
<th>Processing Categories</th>
<th>Key Actors</th>
<th>Nationality Actors</th>
<th>Key Actors</th>
<th>Total Capacity (in tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Processing</td>
<td>Willowton, Epko, Conti-Oil</td>
<td>SA, SA, SA</td>
<td></td>
<td>2.282k</td>
</tr>
<tr>
<td>Full Fat Processing</td>
<td>Majesty Oil, Meadows, Prodsure, Afgri Foods, Sovereign Foods Rockland</td>
<td>SA, N.A., SA, SA, SA,</td>
<td></td>
<td>567k</td>
</tr>
<tr>
<td>Soy Meal (Animals)</td>
<td>Majesty Oil, Nedan Oil, Gauteng Oils, Specialized Protein Oils</td>
<td>SA, SA, SA, N.D.</td>
<td></td>
<td>327k</td>
</tr>
<tr>
<td>Soy Meal (Human)</td>
<td>Majesty Oil, Nedan Oils, Gauteng Oils</td>
<td>SA, SA, SA</td>
<td></td>
<td>104k</td>
</tr>
</tbody>
</table>


**Table 4 Major South African Processing Firms**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilmar Continental</td>
<td>Randfontein</td>
<td>192,000</td>
<td>192,000</td>
<td>192,000</td>
</tr>
<tr>
<td>Majesty</td>
<td>Krugersdorp</td>
<td>156,000</td>
<td>156,000</td>
<td>156,000</td>
</tr>
<tr>
<td>Gauteng</td>
<td>Nasrec</td>
<td>108,000</td>
<td>108,000</td>
<td>108,000</td>
</tr>
<tr>
<td>Nedan</td>
<td>Mokopane</td>
<td>96,000</td>
<td>230,000</td>
<td>326,000</td>
</tr>
<tr>
<td>Drak</td>
<td>Winterton</td>
<td>48,000</td>
<td>48,000</td>
<td>48,000</td>
</tr>
<tr>
<td>Noble</td>
<td>Standerton</td>
<td>620,000</td>
<td>620,000</td>
<td>620,000</td>
</tr>
<tr>
<td>Russell Stone</td>
<td>Brokkhorspruit</td>
<td>310,000</td>
<td>310,000</td>
<td>310,000</td>
</tr>
<tr>
<td>VKB</td>
<td>Villiers</td>
<td>186,000</td>
<td>186,000</td>
<td>186,000</td>
</tr>
<tr>
<td>Willowton</td>
<td>KZN</td>
<td>156,000</td>
<td>156,000</td>
<td>156,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>600,000</td>
<td>1,502,000</td>
<td>2,200,000 (projected)</td>
</tr>
</tbody>
</table>

Source: Grain SA interview (2014)

In 2013, an estimated 1 billion rand was invested by the IDC to increase crushing capacity. This aimed to unleash a crushing capacity of about 2 million tonnes with the aim to stimulate production to match processing capacity. Some of the new plants erected in the last five years include Noble, Russellstone, Nedan and VKB. A number of the firms are involved in several types of processing. For example, Majesty Oils processes both soy and sunflowers, full fat and is involved in making both soymeal for human and animal consumption. The location of the crushing plants or processing firms is also strategically located in areas of soybean production in order to reduce transport costs to maximise on gains. Proximity also aids both small scale and large-scale farmers in delivering and storage.

Though the projected capacity was estimated at 2,2 million tons, interviews suggested that the actual crushing capacity in place was closer to 1.5 million. This was in part due to some of the
investments not being fully realised (requiring both public and private funding components) and in part due to the time lag in scaling up production. One of the interviewees noted that building production volumes up to the full capacity was dependent on a learning process as well as on the availability of electricity. One of the South African processors interviewed noted that they could only use generators to power down and maintain critical equipment in the event of an electricity outage. Power downtime led to the loss of hexane (the solvent used for processing). Reliable electricity together with coal costs to run the boilers were considered to be key challenges/sources of cost uncertainty.

In addition to overall processing capacity, processing decisions in South Africa are determined by the fluctuation of the SAFEX price against a derived price (for import of meal and oil). If the derived price is higher than the SAFEX price, then it is cost-efficient for local processors to crush soybean into full-fat meal, soy-cake, and soy oil. The calculation compares the costs of producing, transporting, and storing both oil and meal from imported soybean to the costs associated with using locally produced and processed soybeans.

The calculations for imported and domestic soybean processing into meal and oil are as follows:

1. Soybean meal price x 0.79 + soybean oil price x 0.18 => derived local soybean price derived from import parity prices and import costs.
2. SAFEX Soybean price - cost of storage/transport/financing - cost of crushing locally => local soybean price derived from domestic production and processing

Table 5 Comparing imports to domestic production

<table>
<thead>
<tr>
<th>Soybean Meal Costs - Imported</th>
<th>Soybean Oil Costs – Imported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price at Durban Harbour R/ton 3415.00</td>
<td>International price (Arg. FOB) $/ton 1136.00</td>
</tr>
<tr>
<td>Transport cost - Durban to Randfontein R/ton 254.00</td>
<td>Insurance (0.3 % of FOB) $/ton 3.41</td>
</tr>
<tr>
<td>Price of imported soybean meal in Randfontein R/ton 3415.00</td>
<td>Import tariff (10 % of FOB) $/ton 113.60</td>
</tr>
<tr>
<td></td>
<td>Freight $/ton 81.00</td>
</tr>
<tr>
<td></td>
<td>Exchange rate (R/US$) 7.05 1334.01</td>
</tr>
<tr>
<td></td>
<td>Harbour cost R/ton 160.00</td>
</tr>
<tr>
<td></td>
<td>Total cost at Durban harbour R/ton 9564.76</td>
</tr>
<tr>
<td></td>
<td>Transport cost - Durban to Randfontein R/ton 332.00</td>
</tr>
<tr>
<td></td>
<td>Price of imported soybean oil in Randfontein R/ton 9896.76</td>
</tr>
<tr>
<td>Soybean Meal and Oil production joint components - domestic</td>
<td>Soybean Meal and Oil joint production costs - domestic</td>
</tr>
<tr>
<td>SAFEX Soybean price Storage, transport, financing costs Crushing costs</td>
<td>Storage costs R/t 43.20</td>
</tr>
<tr>
<td></td>
<td>Transport cost R/t 131.00</td>
</tr>
<tr>
<td></td>
<td>Financing cost R/t 103.11</td>
</tr>
<tr>
<td></td>
<td>Crushing cost R/t 450.00</td>
</tr>
<tr>
<td></td>
<td>Total Costs R/t 727.31</td>
</tr>
</tbody>
</table>

Source: NAMC (2011, p.55)

Domestic processing is thus dependent on domestic price fluctuations, availability and price of imports, and limitations set by the competition with other grains. Price and markets of other grains and oils as well as finding or developing markets for the soy oil present additional obstacles to stimulating regional supply. Processing was seen as a bottleneck in part because of the competition from other oilseeds. Dual processors (for example sunflower and soy processors) are sensitive to prices, storage capacity and demand for other oilseeds for their decisions to process soy. The cleaning and switching costs also influence the choice of grain to be processed.
In order to respond to the growing demand for animal feed from poultry and other stock feed industries, as well as to reduce the cross-grain competition, soybean processing was identified as one of the key priorities across all of the three countries value chain development. Investing into increased processing capacity was seen as a way to create a demand-pull effect for production. This also reflects the desire to capture the higher value added component of the production-processing chain, and in part reflects the concentration of influence of the processing segment of the value chain on policy decisions. South Africa has invested into increased soy processing capacity during 2012-2014. Similarly, processing development has been the focus of policy and industry debates in Zambia. Though Zimbabwe continues to import from both Zambia and South Africa, their interest in developing the value chain was reflected by increasing restrictions concerning imports.

In response to this, the South African investment into increasing single (soy) processing and crushing capacity took place as joint investments with the Industrial Development Corporation. The actual and projected future crushing capacities are shown below.

**Table 6 Developments in crushing and processing capacity**

<table>
<thead>
<tr>
<th>Processing</th>
<th>South Africa</th>
<th>Zambia</th>
<th>Zimbabwe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2012 Estimated processing capacity</strong></td>
<td>600,000 tons/year (associated with Wilmar Continental, Majesty, Gauteng, Nedan, Drak)</td>
<td>Crushing capacity <strong>400,000 tons/year.</strong> In 2014 only 180,000 tons crushed (estimate from interviews).</td>
<td>Between 535,600-650,000mt/year (4 players account for 89% of market share. These are dual processors across cotton and soya. Only 63% of current processing capacity is used.) Zimbabwe’s seed crushers have the capacity to process over 650,000 MT per year (Makoshori 2012).</td>
</tr>
<tr>
<td><strong>2013 - 2014 trends in processing capacity</strong></td>
<td>1,502,000 tons/year Investment into Noble, Russelstone, Nedan, VKB, Willowton) 2013. 2,102,000 divided between Mpumalanga and Gauteng 2014 projected.</td>
<td>New crushing capacity with investment into Gourock Plant.</td>
<td>Innscor group (comprising of key processors and buyers: PHI, NF, Irvine’s, Colcom) requires 80,000mt soyabean or 50,000mt of soymeal/year. PHI typically buys 20,000mt/y locally. In 2014 PHI purchased 30,000mt.</td>
</tr>
<tr>
<td><strong>Actual processing capacity estimates for 2015</strong></td>
<td>Fieldwork interviews suggest not all the projected investment is in place and that actual processing is now approx. 1,500,000 tons/year.</td>
<td></td>
<td>In addition to large established processors, the growing animal feed demand has resulted in the emergence of smaller stock feed manufacturers.</td>
</tr>
</tbody>
</table>
It is noteworthy that each of the three countries has excess processing capacity and insufficient domestic production of soybeans for processing. Despite excess processing capacity in each of the countries under investigation, the demand-pull effect is not generating sufficient changes in production. The concentration of processing in South Africa in the Gauteng/Mpumalanga/KZN nexus accounted for 69% of processing) presents an important advantage in terms of transport and storage costs, but also add. In all three countries, there was evidence of vertical integration between concentrated processing and the more dispersed production units. In Zambia, access to processors was not considered an obstacle. In some cases, larger farms would buy from smaller producers and take on the transport costs.

One of the Zambian farmers commented that finding a market for their produce was not a challenge. One of the Zambian farmers interviewed sold to larger producers/processors with pre-signed contracts. One sold directly to Zambeef. A small-medium-scale farmer interviewed commented that Kabwe is a farming area so it is not difficult to access a market. Some interviewees noted that smaller farmers ‘band their crop together and sell it in bulk to traders’. (Source: interviews with Small-Medium Scale Farmer, Commercial Farmer F, Commercial Farmer G, Small Farmer K.)

Though processing is a controlling node of the value-chain, the obstacles to scaling up production are more complex and arguably more important than upgrading processing capacity. These include the ability to increase production capacity, identify areas where production can be scaled up, improve diversity of the production structure, and update or implement appropriate access to input, storage, infrastructure and information across different types of farmers. There is little integration into global value chains, the industries remain national with the exception of the cross-ownership at the poultry or animal feed level. This limits the ability to upgrade with the assistance of a benevolent buyer enabling the trickle-down of new inputs, processes and technology from the top end of the value chain. Each of the countries has different advantages in terms of production and processing. Zambia’s ability to scale up production through increased small and medium-sized farming, Zimbabwe as a market for soy oil and transport route between Zambia and Zimbabwe, South Africa as a source of inputs, processes and production information. This presents two important policy implications. Leveraging the different national advantages to address national challenges for regional benefit, and cross-investment and sharing of skills and assets to boost production and demand within each of the national value chains.
4.2 Trends in trade, prices, competition, and investment

This section expands on the soy market dynamics, the patterns of imports and exports, prices and costs, and competition within and between the value chains. These present additional obstacles, but also opportunities, for regional market development.

Prices
Soy production and processing is highly sensitive to price. Local prices are aligned to the Chicago Commodities Exchange and are affected by global production and trade trends even though only South Africa is a significant importer from the world. Zambia and Zimbabwe restrict imports through a ban on genetically modified products. Cost of production in comparison with landed (imported) soybean is an important component in decisions about local processing in the short term, and development of the industry (through increased regional production, interaction and other market development) in the longer term. The table below compares the production costs and output prices for the three countries.

Table 7 Price comparison

<table>
<thead>
<tr>
<th>Cost/Price (2014)</th>
<th>Zimbabwe</th>
<th>Zambia</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soymeal price</td>
<td>$600-650/t (max price $800/t)</td>
<td>$450-500/t</td>
<td>Oilcake in 2013-2014 est. 6-6500R/t BFAP (2014)</td>
</tr>
<tr>
<td>Soy oil (crude)</td>
<td>$600-620/t soymeal $680 (fullfat soymeal) imports from Malawi between $500-570/t (imports from Argentina $649 in 2010)</td>
<td>$1200/t</td>
<td>Soy oil in 2013-2014 est. 10,000-10,500R/t or ~$950/t</td>
</tr>
<tr>
<td>Import prices (landed)</td>
<td>$600-620/t soymeal $680 (fullfat soymeal) imports from Malawi between $500-570/t (imports from Argentina $649 in 2010)</td>
<td>(imports from Argentina $733 in 2010)</td>
<td>(imports from Argentina $575 in 2010)</td>
</tr>
</tbody>
</table>

Source: Fieldwork interviews, BFAP, Grain SA. Figures in (brackets) are from Technoserve (2011) and include tariffs and transport. Figures in [brackets] are from USDA Global Agricultural Information Network (2014)

Zambia presents itself as the most cost competitive, able to produce at farmgate prices of as low as $350/mt for commercial and around ~$450 for small-scale farmers. Zambeef estimated that they could bring the cost of production down to $300/t ($250/ton farmgate with $50/t to get to market). This reinforces the view that supporting the growth of production in Zambia can be beneficial to the region.
The diagrams below show the evolution of prices in Zambia and South Africa over the 2000-2010 period as well as the price fluctuations on the SAFEX between 2012-2014. Soy price trends were not available for Zimbabwe were not available. Cottonseed prices are displayed to show a trend for another oilseed. It is expected that soybean prices would be similar.

Table 8 Zambia soy price trends

<table>
<thead>
<tr>
<th>Soybean prices: ZAMACE, Zambia import parity, USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>$/MT, 2003-2010</td>
</tr>
<tr>
<td><img src="image" alt="Graph" /></td>
</tr>
</tbody>
</table>

Source: Technoserve Zambia (2011, p.116)

Table 9 South Africa soy price trends

<table>
<thead>
<tr>
<th>TABLE 9 PRICES OF SOYBEAN VERSUS PROCESSED PRODUCTS, 1999/2000–2010/11 ($ PER METRIC TON)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Graph" /></td>
</tr>
</tbody>
</table>

1. U.S. farm price.
2. Based on the average wholesale price for 48% protein.
3. Average wholesale tank crude price.
Source: USDA 2011

Source: ACET (2014, p.22)
Table 10 Zimbabwe average cottonseed prices

![Cottonseed Price Chart](chart.jpg)

Source: AMA 2014

Table 11 South Africa SAFEX soy prices and import parity 2012-2014 (end Aug)

![Soybean Price Chart](chart2.jpg)

Source: Grain SA 2014 (interview)

Though there are some individual characteristics, the general trend mirrors a global rise in the price of soybeans.

**Transport, storage and electricity**

Bringing Zambian soy to South Africa remains a challenge. Export growth depends on being first able to meet domestic market needs. Transport costs, exchange rate fluctuations, storage costs, and perceptions about the superiority of Argentine soybean also affect the ability to use Zambian produce to supply the region. Transport relies primarily on the availability of trucks and road quality though rail links are also gradually improving. Transport through Zimbabwe is estimated by Zamanita to cost $63/truck to cross the border into Zimbabwe, and $100/t from Lusaka to
Randfontein. Internal transport costs from Mkushi, one of the primary production areas, to Lusaka is estimated at $30-40 (the distance is approximately 150km). Reducing border and transport costs remains a key challenge. Technoserve Zambia (2011) estimates of transport costs from Zambia to Zimbabwe were $50/t and to South Africa $130/t. Estimates of transport costs in Zimbabwe were $20/t for up to 100km, $20-22/t for distances greater than 100km. Transport into Zimbabwe can also be set costs by volume with transport and border crossing costs from Zambia set at $60/t and $100/t from South Africa. To address some of the transport issues, the Zambian government initiated a road upgrade programme called Link Zambia 8000 with the aim to build 8000 roads. Feeder roads from agricultural areas are most in need of upgrading. Transport permit delays with new government instruments set by the Zambia Environmental Management Agency (ZEMA) also influence the time and cost involved to transport.

Whilst there is scope for increasing collaboration between producers in Zambia and Zimbabwe, in the event of future production increases, bringing soybean or soymeal to be processed in South Africa is costly in terms of transport as well as storage. The diagram below from Technoserve using 2010 estimates shows the differences in the cost of bringing soybean to the Reef (Johannesburg), South Africa or Harare, Zimbabwe.

Table 12 Cost differences in getting soy to market

<table>
<thead>
<tr>
<th></th>
<th>South Africa</th>
<th>Zambia</th>
<th>Zimbabwe</th>
<th>Malawi</th>
<th>Mozambique</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybeans at farm</td>
<td>383</td>
<td>350</td>
<td>400</td>
<td>280</td>
<td>343</td>
</tr>
<tr>
<td>Land transport</td>
<td>2040</td>
<td>145</td>
<td>100</td>
<td>148</td>
<td>191</td>
</tr>
<tr>
<td>Ocean transport &amp; port</td>
<td>527</td>
<td>532</td>
<td>560</td>
<td>453</td>
<td>565</td>
</tr>
<tr>
<td>Tariff</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>CIF delivered value @</td>
<td>383</td>
<td>350</td>
<td>400</td>
<td>280</td>
<td>343</td>
</tr>
<tr>
<td>Reef</td>
<td>383</td>
<td>350</td>
<td>400</td>
<td>280</td>
<td>343</td>
</tr>
<tr>
<td>CIF delivered value @</td>
<td>383</td>
<td>350</td>
<td>400</td>
<td>280</td>
<td>343</td>
</tr>
<tr>
<td>Harare</td>
<td>500</td>
<td>412</td>
<td>410</td>
<td>386</td>
<td>413</td>
</tr>
</tbody>
</table>

Technoserve (2011, p.35)

Soybean storage requires for moisture control. It is estimated that soybeans can be stored safely for approximately 1-2 years. Storage availability and cost also presents a challenge for increasing production, in particular for Zambia and Zimbabwe. Storage price estimates from Zambia were approximately $50/t. Given the difficulty of selling soy oil and the competition from palm oil imports, oil storage tanks were full preventing further soybean processing. Soymeal storage availability was also a problem for Zambian processors. One of the interviewees (Trader X) noted that though there was excess crushing capacity and only some 50% was in use (est. 180,000 out of total 400,000tons capacity), only some 60% of the soymeal produced was absorbed by the Zambian market leaving the remainder to be stored. The lack of available storage was perceived to act as a deterrent for further processing increases, which in turn would reduce demand for soybeans and slowdown any growth in the planting of soybeans. For Zimbabwe, The feedback on storage in South Africa showed that there was adequate storage but that soy competed with other grains. Storage is concentrated around processing units. Small-scale farmers in remote areas would still face storage availability challenges.
Electricity was cited as one of the main costs and sources of uncertainty across the three countries. At the production stage, electricity shortages affect irrigation and result in technology maintenance and repair costs as well as lower yields or loss of crop. Processors are dependent on electricity as both mechanical crushing and solvent-based oil extraction employs expensive machinery. Electricity is required to ensure low-moisture storage. Electricity outages across the three countries present significant cost and production challenges.

**Imports and exports**

South Africa has small exports to Malaysia for luxury tofu market and imports from soybean and meal from Argentina. Zambia is a net exporter of meal and cake to Zimbabwe, Botswana, South Africa, and the DRC. Zambia imports soy oil and palm oil (latter from Indonesia via Kenya). Zimbabwe is a net importer of beans and meal from Zambia, India, Brazil but also from Malawi and South Africa (oil). There is scope to support regional market development through the prioritisation of imports from the region. This applies in particular to South Africa and imports from Argentina.

**Table 13 South African soybean imports**

<table>
<thead>
<tr>
<th>Year</th>
<th>South African Imports of Beans</th>
<th>Million Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
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<td>2010</td>
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<tr>
<td>2011</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
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</tr>
</tbody>
</table>

Source: Quanetc Soybeans Imports H1201

South Africa imports more soybean oilcake than soybeans. South Africa has seen a steady rise in oilcake imports from the Americas. From 1996, oilcake imports from the Americas ranged at approximately $52 million to about $350 million in 2011/2012. In the late nineties and between 2007 and 2009, some imports originated from Asia. Within the Americas, Argentina surfaces as the top exporter of oil cake to South Africa. From 1994 exports from Argentina to South Africa ranged at about $20 million to just under $400 million in the past five years. The preference for importing oilcake as opposed to beans arises from the fact that oil cake is less bulky and hence easier to transport. In 2007-2008 there was a shortage of soybeans resulting in a peak of imports.
Most of the soy oil exports from South Africa go to Zimbabwe with a peak in 2012. As seen below, Zimbabwe saw an increase in imports and decline in exports from 2008. The volume of Zimbabwe’s soy imports has been steady for all the products from 2000 to 2009 (see below). From 2010, imports of cooking oil and soybean meal increased significantly, indicating increased dependence on imports for these products. Imports of crude soybean oil and soybeans remained subdued for the same period.
Table 15 Zimbabwe soy imports

<table>
<thead>
<tr>
<th>Year</th>
<th>Soybean imports ($1,000)</th>
<th>Soybean cooking oil imports ($1,000)</th>
<th>Soybean meal/cake imports ($1,000)</th>
<th>Crude soybean oil imports ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>500</td>
<td>100</td>
<td>200</td>
<td>300</td>
</tr>
<tr>
<td>2001</td>
<td>600</td>
<td>150</td>
<td>250</td>
<td>350</td>
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<tr>
<td>2002</td>
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<td>2003</td>
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<td>2004</td>
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<td>2005</td>
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<td>2006</td>
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<tr>
<td>2007</td>
<td>1200</td>
<td>450</td>
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<tr>
<td>2008</td>
<td>1300</td>
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<td>2009</td>
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<tr>
<td>2010</td>
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<td>2011</td>
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<td>650</td>
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</tr>
<tr>
<td>2012</td>
<td>1700</td>
<td>700</td>
<td>800</td>
<td>900</td>
</tr>
<tr>
<td>2013</td>
<td>1800</td>
<td>750</td>
<td>850</td>
<td>950</td>
</tr>
</tbody>
</table>

Source: AIAS calculation soybean products imports 2000-2013 ($)

Exports of soybeans were very high in 2000, which immediately dropped and this phase coincided with the inception phase of the Fast Track Land Reform Programme implemented in 2000 (see below). Thereafter exports have remained subdued below the $1 million level, except in 2008-2010, when exports exceeded $2 million.

Table 16 Zimbabwe soy exports

<table>
<thead>
<tr>
<th>Year</th>
<th>Soybean exports ($1,000)</th>
<th>Soybean cooking oil exports ($1,000)</th>
<th>Soybean meal/cake exports ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>100</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2001</td>
<td>150</td>
<td>75</td>
<td>150</td>
</tr>
<tr>
<td>2002</td>
<td>200</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>2003</td>
<td>250</td>
<td>125</td>
<td>250</td>
</tr>
<tr>
<td>2004</td>
<td>300</td>
<td>150</td>
<td>300</td>
</tr>
<tr>
<td>2005</td>
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<td>175</td>
<td>350</td>
</tr>
<tr>
<td>2006</td>
<td>400</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>2007</td>
<td>450</td>
<td>225</td>
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<td>2013</td>
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<td>375</td>
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Source: AIAS calculation soybean products exports 2000-2013 ($)

The Zambian import and export data show a peak in crude oil imports in 2012 and growing seed imports. Soymeal and oilcake exports, destined for Zimbabwe are seen to grow after 2009, peaking in 2013.
Other influences on regional production and cooperation

A number of specific features of the soy supply and demand restrict interaction and production growth. One of these is the ban on genetically modified seeds, beans and other soy products. Zambian and Zimbabwean production is non-GMO. This restricts imports from South Africa. South Africa is willing to import from any source. However, the interviews suggested the soy oil produced using GM seed variants was entering Zambia and Zimbabwe. Policy support for maize also affects soy production. In Zimbabwe, the government sets the maize price at $390/t. In Zambia maize is also supported by the government. The Zambian Food Reserve Agency (FRA) is one of the main purchasers of maize from smallholder farmers. Its aim is to function as Zambia price and supply stabilizer of maize. This policy automatically makes maize a better preferred crop to soy as there is a guaranteed maize market. The Farmers Input Support Programme (FISP) subsidizes maize inputs such as fertilizer and seed. This initiative was aimed to encourage
smallholder farmers to farm. This once again encourages smallholder farmers to grow maize rather than soy beans because it is more cost effective (Technoserve 2011, p. 51).

Competition in Zambian production and processing was noted from maize, cotton, palm oil and sunflower (though the latter was considered too abrasive and difficult to grow). In Zimbabwe, competition was noted to arise from cotton, tobacco, and maize. In South Africa, competition was noted from maize and sunflower. For biofuel products competition was from sugarcane. Competition from other oilseeds presents itself as a challenge to increasing production and collaboration. For example in Zambia, most smallholder farmers prefer maize. With an estimate of 80% of small-scale farmers and the evidence of production increases through small-scale farmers, helping farmers add on or switch to soy production in Zambia (and Zimbabwe) is an important policy challenge. The decision to process soybean into cake or meal as opposed to selecting another oilseed is also important as noted earlier. Competition from other oils also represents an important challenge to increasing production and closer regional collaboration. The import of palm oil into Zambia from Indonesia (via Kenya) and the production and import of other oils, especially sunflower oil, into South Africa and Zimbabwe crowd out the oil market. In addition, the South African consumer has a lower preference for soy oil in cooking. Developing the domestic markets for soy oil as well as developing alternative products derived from soy oil are important challenges that affect the scope for scaling up soybean/meal production.

This raises questions about investment into product development, overcoming perceptions about the lower quality of South African soy, as well as meeting the different but equally stringent food safety and phytosanitary requirements for food production from soy oil. According to DAFF 2013, p. 18, “SPS measures go as far as including issues pertaining to labeling requirements of products, the use of genetically modified organisms, and the physical handling and/or transportation of goods. Such requirements are enforced or determined by governments through statutory legislation or voluntary codes of practice implemented by the private sector, or by international bodies such as the FAO/WHO Codex Alimentarius Commission which has international standards and guidelines that apply to a wide range of products.”

In practice this means the need to ensure the absence of harmful content such as pesticides, organisms, fungicides as well as to provide certification regarding the protein content of the product. Perceptions about quality have affected South African producers in particular, arising from the poorer soil quality and need for inoculants, fertiliser, pesticides and other production inputs. One of the respondents, a South African processor contested the difference in quality and commented that a study comparing South African and Argentinian bean quality was underway at the University of Pretoria.

Other policy influences on the soy industry include a focus on seed research to identify more drought, pest, and disease resistant variants suited to the local climate and soil. One of the South African policy representatives interviewed noted that with appropriate research support, South African could become a regional supplier of seeds. In Zambia, research conducted at the University of Zimbabwe, Department of Soil Science and Agricultural Engineering focused on enhancing the productivity of small-scale farmers.

Trade policy also influences the soy industry. South Africa has set soybean meal import tariffs at 6.6%, soybean oil tariffs at 10%. Imports from SADC and the EU are free of tariffs. Otherwise South African trade remains unregulated though there have been calls for both import protection to

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8 Technoserve Zambia (2011, p. 53) document that since the 2005 changes to the FRA involvement, over 90% of smallholder produced maize is sold to the FRA through 600+ sites with homogenized prices above wholesale market prices.
allow domestic production and processing to consolidate (NAMC 2011) and grow as well as a liberalisation of all tariffs (called by the animal feed producers and processors).

Zimbabwe’s trading in soybeans has been liberalised since 1992. The oilseeds sub-sector is regulated by Statutory Instrument 140 of 2013 administered by AMA, regulate the production, buying or processing of any grain and oilseeds. The government of Zimbabwe has maintained a GMO free policy despite calls from a wide spectrum of stakeholders to lift the ban on production and marketing of GMO products. Stakeholders in the oilseed industry argue that the majority of oilseed products being sold and consumed in Zimbabwe originate from GMO producing countries, particularly South Africa, therefore there is no need to stop production of GMOs when consumers are already consuming these products. The re-introduction of edible oilseeds trade protection since 2011 has been justified as enabling the full use of the capacity of the domestic agro-processing industry. Increasingly, the investment policy (including the “Indigenisation Policy”) have been relaxed to enable foreign purchase of equity in this industrial agro-processing, on grounds of protecting jobs in the edible oil and stockfeeds.

Several laws are considered to inhibit stock-feed production and marketing, although administrative mechanisms associated with the implementation of the laws are the main challenges. Farm Feeds Regulations 1968 (corrected by SI 68/2001) – These Regulations outline the requirements for registration and the analysis/assessment that is used by the registrar to reach his/her decision. The Grain Marketing Act [Chapter 18:14] provides for restriction in the movement of controlled products; regulation of the sale or delivery of controlled products; regulation of the acquisition of controlled products; and the annual fixing of prices of controlled products. The Act regulates the marketing of controlled products, which mainly include grain that constitute an important input in the manufacture of stock-feeds. In 2011, imported crude soya bean oil (a semi processed raw material) attracted a duty of 5% when cooking oil would come duty free, negatively affecting the competitiveness of local oilseed industry, while cooking oil was duty free. However, this duty has since been scrapped and there is a tariff on cooking oil imports.

The Zambian government instituted trade bans and there is little consistency regarding export permits and this decreases the country’s export competitiveness, as supply cannot be guaranteed. Another policy that is negatively affecting soy is the tax-free import of palm oil under COMESA, which reduces the price of soya oil. The palm oil is reported to come from Malaysia through Kenya and Tanzania (Technoserve 2011,p.54). Another factor that makes soy export difficult for Zambia is that import and or export permits that are issued by the Ministry of Agriculture and Cooperatives are inconsistent and the ministry has been reported to have little transparency. As a result of this, contributors to soy production who operate in the private sector are cautious when it comes to exporting, as permits and export bans are inconsistent (Technoserve 2011,p. 25).
4.3 Tensions and conflicting interests

The scope for industry development at the national and regional level depends on the nature of relations and tensions between different interests within soy production and processing. The research investigated features of the economic environment that affected the ability to collaborate. These included transport infrastructure and costs, storage, trade and other policy constraints (GMO, phytosanitary and import duties), perceptions about variation in soy quality and yields, and the availability of training and information regarding inputs. Regarding the relations and tensions within the soy industry, the following were identified to represent areas of differing interests. Relations between the three countries in general, and more specifically within-country relations between producers and processors, different needs and challenges of soymeal and oil markets, differences between smallholder and large-scale farmer needs, and different focal points within government across questions of land reform, market access, input and output markets, employment questions, industry competitiveness (with variation in interests both within the national industries and across the region).

Among many challenges that cloud the relations between the three countries, attention is drawn to two important issues. These are the lack of cross-border investment or co-production and the fear that an integrated regional value chain could risk reducing Zambia and Zimbabwe to the status of low-value-added soybean supplier with South Africa capturing the gains from the high value-added processing and production of final goods. The lack of investment, limited or no co-production, and low trade reflects the lack of interest in developing regional interaction between firms. These would act as a starting point for developing more complex forms of collaboration in production or shared markets. Reasons for the lack of interest that emerged from the research included the high investment risks (especially for South African firms to invest in Zimbabwe or Zambia), the desire to focus on national markets and production, as well as various policy challenges. Most South African respondents agreed that in the longer term, it would be interesting to source inputs (e.g. soybeans) from neighbouring countries and that investment into co-production would be interesting. Several commented that the IDC would be a useful way to reduce investment risks and to coordinate across borders. At the same time, there was a general consensus that prices determined business operations for processors and traders and that the availability of lower cost imported soybeans or meal reduced the incentive to source from the region. Despite this, interviews revealed that processors were sourcing Zambian beans or meal despite the transport costs, export restrictions, or availability of imports. The main driver in the end was the price of the soybean. The source, as long as the quality was above a required standard, was not a critical element for decision-making.

The response from Zimbabwean and Zambian interviewees was somewhat different and reflected a desire to focus on the development of the domestic market by increasing processing and ensuring that the higher value-added segments of the chain from production-animal feed were completed within the national borders. This reflected a general concern of being locked into a role of a low-value supplier for a high-value processing hub in South Africa. These concerns also deter cooperation between Zambian producers and South African or other country processors. This concern applies in particular between Zambia and South Africa as well as Zimbabwe to South Africa, but may also be reflected in the relations between Zimbabwe and Zambia. During the course of the fieldwork in September-November 2014, Zimbabwe unexpectedly closed the border to income finished and raw materials turning away trucks seeking to cross. According to one Zambian interviewee (Novatek), this directly affects processors who are left with a surplus as well as indirectly affecting small-scale farmers as processors and traders may reduce future bean purchases before stocks are sold.

Tensions were noted between producers and processors within a national industry as well as between processors and traders. Different needs also emerged from the high demand for soymeal
from the animal feed industry and the low demand for soy oil from other soy-based food production, paint and chemical industry, or from biofuel development. The competition from other oilseeds or other inputs to each of these industries, and the challenges in developing the regional market for soy-based foods or biofuel were identified as important. A further area of tension emerged within policymaking and the different focal areas of government departments. Producers (farmers and workers) interests were associated with agricultural and labour departments. The interests of processors and traders as well as other value-added industrial manufacturers of soy-related produce were more likely to be represented by departments of trade, industry and trade commissions.

Other sources of tension identified in each of the three countries were: the questions around land reform and redistribution of tenure, and the limited employment opportunities of developing agro-processing. Though these were not central to the initial investigative research unemployment and land reform are critical and contentious issues across all the three countries under investigation. This is discussed briefly in the theoretical review that follows. Land reform and employment questions present important policy areas that have not been reviewed in this initial investigative study. A brief mention of the some of the national characteristics and how these may influence soy production is provided below.

Following the Zimbabwe Fast Track Land Reform Programme (FTLRP) in 2000, the production of oilseeds and feedstock grain declined substantially between 2002 and 2011, leading to their increased importation. The domestic oilseed processing subsector had also declined during this period, culminating in the country being a net importer of both edible vegetable (cooking) oil and stockfeed supplements required to meet the requirements of the beef, dairy, poultry and pig feed industries. Since 2012, the edible oils and stockfeed sector are perceived to be recovering compared to the rest of the agriculture sector. Production challenges arising directly from the tensions around land ownership relate to the ability to use land as security for credit. Fragmentation of the representation of interests across the Commercial Farmers Union (former white commercial farmers), the Zimbabwe Commercial Farmers Union (indigenous black commercial farmers), Zimbabwe Farmers Union (communal and small-scale commercial famers) and the Zimbabwe National Farmers Union (farmers resettled during FTLRP) results in lobbying difficulties and varying pressures on policy. In Zambia, according to the Zambian Development Agency (ZDA) land availability is not a problem. However, land tenure is customary (owned by chiefs) or state-owned. This results in an absence of title to the land being farmed and similar to Zimbabwe raises problems regarding securing funding against the land.

Regarding employment, shared features across the three countries was the limited employment creation in soy processing and the use of casual or temporary labour in agricultural production. Though wage-employment in agriculture is an important source of income, the nature of the employment presents challenges in the form of developing long-term employment relations conducive to skills development and job security. The informal or temporary nature of employment makes it difficult to capture in statistics and increases the focus on wages as a cost. Some of the Zambian respondents commented on the increase of minimum wages from K12.8 to K22 in one year (2014). Developing a better understanding of the nature of employment is necessary to help create supporting policies. This requires a shift away from perceiving labour as a short-term cost and moving towards developing long-term relations, skills, and interactions that view labour at the core of production capabilities and as the source of innovation, upgrading and value-added. Focusing on soy production and processing alone is insufficient. DAFF (2013, p.6) estimates that “the broiler hatchery and rearing industries employs 14,481 people, the processing sector employs a total of 27,564 people, the broiler distribution industries employs 6,073 people. Total of employment within the broiler industry is 48,118 employees”. Spill-overs from the poultry industry provides scope for employment creation in related industries such as fast food and retail.
4.4 Summary of findings and scope for regional development

The discussion across South Africa, Zambia and Zimbabwe suggests that there are important similarities and differences across the national value chains. These emerge from a comparison of the

- nature, obstacles and opportunities of production, processing
- trends in trade, prices, competition
- relations within the national value chains as well as with outside stakeholders and partners or interested parties
- (dis)/interest and scope for regional development

The soy production-processing chain is dominated by entities in higher-value activities, in that processors determine the price, quantity and speed of intake from producers. Insufficient processing was perceived to be the primary obstacle to the industry with the view that increased processing capacity would create a demand-pull effect for producers to increase output or supply of soybean. All three countries have unused processing capacity although the reasons vary slightly. A closer investigation revealed that insufficient production and the need to boost production are very important alongside improved processing capacity.

Zambia experiences storage and transport challenges/costs, and soy production increases are hampered by lack of access to finance, inputs, information, as well as by competition from other agricultural crops such as maize with a government guaranteed price. Zimbabwe is characterized by tensions and political contestation of land, which has resulted in uncertainty and stagnation in agricultural production across multiple products not just soy. Access to inputs is costly and unreliable, and electricity and transport also present problems. Production increases are also deterred by the inflow of low-cost imports especially from Zambia and Malawi, with processors choosing to prioritise short-term cost benefits over longer-term redevelopment of domestic production capacity. In South Africa, competition from other crops and imports of low-cost high-quality soybean from Argentina provide a disincentive for increased production. Processing investments have not triggered greater production and the existing production is with large commercial farmers with little scope for increase in small-scale farming. Poor land quality with implications for input costs resulting from the soil quality and need for irrigation also contribute to the production disincentive in South Africa.

The challenges for each industry are in principle across similar categories: cost and availability (storage, inputs, transport, electricity), output market access, import competition, funding access/cost, soil quality, information/technical knowledge, domestic competition from other grains/oilseeds, weather, irrigation/rainfall, need to find a market for soy oil, and price fluctuations. However, the precise form or importance of each of these factors varies greatly across the countries creating important areas of comparative advantage. These present an important opportunity for leveraging, not just market access, but the different production and processing assets, skills, capacities and scale. The scope for demand development, especially in the form of growth in the animal feed or livestock industry, in the three countries, also represents another important area for joint/regional supply and demand development. At the same time, the concentration in processing, animal feed production and poultry is very high. These industries act as controlling nodes for the upstream producers and crushing through the quality and protein content requirements, pressure on price. Diversifying the dependence on the demand-pull from animal feed would also stimulate further demand for the production of soy and potentially reduce the concentration of control and capture of value added at the top end of the value chain.

Another shared challenge across the three countries is the limited market development for soy oil, a by-product of soybean processing into animal feed. Developing soy oil markets is important for enabling an increase in soymeal production. Future areas of demand growth can emerge from
parallel industries such as cosmetics, soy food derivatives such as tofu, pharmaceuticals and construction industry. Biofuel development also represents an important source of future demand growth although political challenges in formulating the policy remain and competition with other biofuel products such as sugarcane also require further investigation. Soy oil and biofuel market and strategy development could represent less controversial and untapped areas for regional collaboration.

Stimulating increased production, addressing different input challenges, identifying new soy markets and markets for soy oil, and reducing the dependence on imports are all important areas for policy development. These would require a careful identification of the micro or firm-level opportunities for sharing different advantages. With the dominance of commercial farms and capital-intensive production and processing there limited employment potential in South Africa. Zambia and Zimbabwe present opportunities for not only increasing production through the presence of small- and medium-scale farming, but also present opportunities for increased employment within the region. South Africa is able to offer an established finance, storage and transport infrastructure, inputs such as fertiliser and inoculants, available processing capacity and demand from the domestic poultry market. South Africa would also be well placed to support joint government-private investments through the IDC.

The trade-off between increased access to locally produced soybean from Zambia and Zimbabwe in return for employment increases, access to inputs and finance, and investment into the development of the national processing and higher value-added production from South Africa could represent an area for regional collaboration. Overcoming the mutual disinterest or mistrust also requires harmonisation of national support strategies for soy production and trade, and reviewing border crossing procedures as well as phytosanitary requirements and other policies such as the ban on GM produce in Zambia and Zimbabwe.

At the national level, resolving the access and ownership of land is an important challenge that affects the three countries in different ways. At the core is the need to ensure that land is available not just to those who already produce, but to diversify and increase production with new entrants. Land tenure is an important source of collateral to finance agricultural activity. It is also an important source of employment.

Scope for upgrading by benefiting from the technology, processes, inputs and know-how of a buyer or other entity at the top end of a global value chain is limited as the industry in each of the three countries is distinctly local. Involvement with global markets was confined to imports (relevant especially for South Africa and Zimbabwe). Local chain components production, processing, traders, animal feed, poultry (or other) remain distinct with little interaction in upgrading processes, technology, skills or inputs for what are perceived to be separate industrial or agricultural activities. Whilst there is scope for developing each of these national industry segments by addressing specific challenges or improving collaboration within a national value chain from soybean to poultry, the existing regional collaboration is minimal and unlikely to emerge without substantial and strategic policy collaboration across the three countries. A selection of different frameworks for exploring agro-industrialisation and understanding industrialisation more broadly are described next.
5.0 Concluding remarks

This study is a preliminary investigation into the interest and scope for regional collaboration in Southern African soy production. It highlights the importance of considering the confluence of value chain, structuralist industrialisation and accumulation theories to interrogate the scope for agro-processing as a platform for industrial development at the national and regional level. Starting with the two core conceptual approaches provided the space to explore the differences between industry or sector development as opposed to industrialization. Industry development is understood narrowly to comprise firms or activities linked within a supply relationship (up- and downstream), beneficiation or value adding within a chain or production network, or otherwise associated in a supply demand relationship involving intermediate or other inputs to production. The notion of industry development rests heavily on value chain concepts, prioritising prices in a short term time period as the main mechanism for change.

In contrast, industrialisation is understood as a broader process of multi-sector development that relies on a range of productive and economic relations within and across industries. This can include backward and forward, consumptions or employment linkages, but also fiscal or other forms of connections such as technology or skills transfer not restricted to firm-firm or employment relations. Structuralist notions of industrialisation are based on a longer time period, allow for cumulative and self-sustaining interaction, and incorporate a broader set of economic actors (workers, consumers, government) as well as the corporations and other productive entities.

The conceptual framing provided the research questions to explore the different characteristics of the national soy value chains in South Africa, Zimbabwe and Zambia. The principal questions behind this research were:

1) what is the nature of the drivers and obstacles for the development of the soy production-processing sectors in Zambia, Zimbabwe, and South Africa?
2) how could development of the soy industry support a broader process of agro-industrialisation?
3) what is the existing and potential scope for greater regional collaboration and industry development across these countries?

The findings showcase a number of differences and similarities across production, processing and policy. These reveal a narrowing of the focus by time, within a particular input-output chain, and within that a bias towards the role of enterprises. The narrowed focus and ongoing differences also reflect a continued consolidation of power and the absence of broader linkages for example through increased employment, skills transfer or stimulus for development of technology or other inputs. The findings also point to the importance of situating the production relations within the industry, national and regional contexts to identify the limited space for regional cooperation and or even national industrial development.

For example, the Zimbabwean soy value chain is situated in the context of the land reform and dollarisation with smallholder farmers representing a large component of the production and unused processing capacity. The South African soy activities are characterized by: large commercial farmers, recently upgraded processing capacity and imports of soy cake to cover for domestic production shortages. Zambian soy production is set within the context of the growing poultry production and demand for animal feed, but also the surplus of maize and government support for switching to soy cultivation. Prices in all countries are determined to a large extent by import prices as set on the Chicago Commodities exchange and influenced by dominant global producers/processors in Argentina, Brazil and the USA. These raise important questions about the possibility for regional cooperation especially from the perspective of developing regional
production chains for regional markets with the view to replacing some of the imported seeds, beans, oil-cake, oils and other products. The regional collaboration space has also been determined by national differences in access to funding/investment, policy such as import and export controls but also rules on genetically modified variants, as well as the nature of the demand for oil from the growth of poultry and beef industries as well as growing demand for soy oil.

The challenges faced by the national soy production/processing industries are different in nature, but at the core, the shortage of sufficient quantity and quality of soybean production in the region is acting as a bottleneck. Increasing production is a potential driver of agricultural development in light of the growing demand for soy-based animal feed especially for the poultry industry, as well as the scope for developing other soy-based products, the soy oil market and soy for biofuels. The challenge for the industry is thus to meet the supply shortages in a buyer and demand-driver environment. The value chain is cost-based and regional production is insufficient to meet the existing demands resulting in import competition. These present important opportunities for securing the regional supply market and developing joint demand. These opportunities are unlikely to be realised through a laissez-faire approach as firms and value-chain segments remain separated and focused on their own short-term interests.

Delving into further detail, the particular form of the production challenges and demand from animal feed/poultry industry vary across the three countries. The main differences in the production challenges arise from the different economic structures and geographic circumstances. For example, the scope for increasing production in Zambia and Zimbabwe is greater than in South Africa given the varied composition of the agriculture (including small-scale and medium-scale farming even though soy production is currently led by large-scale commercial farming). The scope for increasing production is also greater in Zambia and Zimbabwe due to their higher soil quality and availability of arable land. In contrast, South Africa has advantages in terms of advanced finance, storage and transport infrastructure, ports providing cost-effective access to imported inputs from Latin America, and the largest processing capacity, animal feed industry and poultry industry of the three countries.

Zambia and Zimbabwe face production challenges including production knowledge, agricultural input access and costs, access to finance, storage shortages, and transport costs/challenges. Some of these can be linked land redistribution or ownership tensions resulting in uncertainty, low investment incentives, and difficulties in raising finance without secure land for collateral. Each country has excess processing capacity, which due to the production challenges has not translated into a significant increase in production. In part this is due to competition from other grains (for farming), other oilseeds (for processing), and due to the availability of low-cost imports. Import competition and an undeveloped soy oil markets also constrain production increases.

This case study concludes on two important aspects. Firstly, it highlights the importance of developing a better understanding of the tensions and particular needs of soy production, processing, and the economic environment for these activities. This is important given the existing and growing role of soy in animal feed production and the emerging response to growing consumer demand for animal feed through demand for poultry, but also the production increases in response to the increasing prices for soybeans, meal and oil. Secondly, it draws attention to the need to investigate ways to overcome existing challenges and develop the industry through diversification of production and deepening of the market for soy oil and soy-based food and other industrial products.

The findings present a number of soy industry and policy challenges that constrain both regional industry development as well as industrialization in the broader and longer term (cumulative) sense. From the perspective of soy industry development, the main challenges are to:
- increase production of soybeans especially in high soil quality areas of Zambia and Zimbabwe,
- shift away from the dominance and market-bias favouring large commercial farming and focus support and policy on the challenges of small-scale farmers,
- develop soy oil markets and reduce import competition especially from palm oil as well as other oilseeds,
- overcome the national focus, mistrust or disinterest, and general inertia by leveraging the different national advantages

To shift the focus away from the short-term and firm-focus (cost-minimisation), it is important to:
- harness the consumer demand impact on poultry to support development at the production end and soy processing coordination
- resolve long-term production challenges arising from land reform tensions and uncertainty,
- develop linkages between the different national segments of the value chains (such as between processors across the three countries) to foster investment and co-production
- develop stronger linkages within value chains to further the scope for upgrading and sharing of knowledge and gains.
- develop new soy product markets derived from soy oil or soy meal to reduce dependence and control of the poultry (livestock) and intermediate animal feed industries.

To facilitate cross-border transactions, it is important to:
- develop the storage, transport and border-crossing facilities in order to reduce the costs of regional transactions,
- develop shared projects and strategies, for example in biofuel development or soy oil markets,
- reduce mistrust and disinterest by identifying mutual benefits from leveraging different national assets and characteristics to overcome different national industry obstacles.

Regional industry development with a longer-term focus would also require exploring:
- linkages few to other industries (e.g. processing technology comes from Europe, other uses for soy in food, cosmetics, pharmaceuticals, fast food, paint)
- new regional markets (e.g. Malawi for soy oil, Botswana, DRC)
- diversifying transport options by upgrading rail infrastructure
- developing training programmes as well as information targeting small-scale farmers
- the scope for employment development to strengthen production capabilities, alter the labour relations, and to create the scope for consumption and skills transfer linkages.

Developing soy agro-processing can help upgrading national production and market supply. However, the ‘silto’ nature of each of the national industries requires strategic and targeted policy intervention. This is in order to help develop regional supply, as well as capture opportunities presented by the growth of regional demand. The way in which upgrading and industry development is framed within global value chain approaches shifts the focus onto firms, cost, and short-term dynamics. Segmentation of interests within the national value chains limits the ability to transfer skills, technology, processes, value-added gains or challenges and needs from one segment (e.g. producers) to another (processors). This results in little change in the power structures of the national value chains and acts as a constraint to the development of broader regional and longer-term agro-industrialisation.

The existing debate around regional industry development and collaboration has centred on notions of trade. These have included discussions on removing obstacles to trade such as border process facilitation, transport infrastructure improvement, costs of trade in terms of tariffs or
transport costs, and around access to inputs or output markets. These are important starting points for developing regional collaboration, but these are not sufficient to trigger the demand and supply integration that looks beyond the short-term interests of individual firms, value chains or sectors. A broader regional industrial development agenda would need to look to fostering shared demand, joint or synergistic production linking, and develop intra-industry linkages as well as consumption, input-output, technology, skills, and other connections to industries or economic activities not directly connected by supply and demand. This is based on understanding industrialisation from a geographically broader, long-term, cumulative and multi-industry perspective. It also necessitates a strategic and collaborative investigation of the ways in which the industries (as opposed to nations) that characterise the regions economic activity can interact. This would draw on the different intra-sector and national advantages, differences in the needs and growth of demand, and leverages the different, but complementary assets, capacities and stages of soy development in South Africa, Zambia and Zimbabwe.
## 5.1 Summary of areas for policy review

| Production and processing | Developing small-scale farm production  
Regional production and processing collaboration and investment (both government and private) into improved national capacity  
Shared processing between countries  
Shift focus away from short-term and firm-focus towards labour and long-term collaboration at multiple levels (within and between value chain entities, between countries, at policy and industry level) |
|--------------------------|----------------------------------------------------------------------------------|
| Overcoming challenges for small-scale producers: input access and costs, | Soil quality testing,  
Knowledge about right fertiliser, inoculant, farming practices etc.  
Better and cheaper access to farming inputs  
Cost and access to storage and transport  
Access to finance  
Investment into training and information access |
| Environment and infrastructure | Transport, storage upgrade, Zambia and Zimbabwe  
Harmonisation and collaboration on transport and storage across 3 countries  
Electricity reliability for all three countries  
Border facilitation and costs |
| Competition | Reducing imports from outside the region (palm oil and beans/meal from Argentina)  
Exploring issues of competition from other crops (maize and other oils for production, other oilseeds especially for crop selection (production) and dual processors).  
Mapping out import and export patterns of individual firms (processors, traders) |
| Market development | Biofuel market and strategy development (joint)  
Soy oil market development (joint)  
Soy derivative products  
Investing into the development of other national value chains to animal feed/poultry  
Access to new markets (Botswana, Malawi, Mozambique, DRC)  
Identifying |
| General economic concerns | Credit access  
Issue of land as collateral  
Developing employment statistics (e.g. understanding cost of labour)  
Training and employment support  
Employment creation |
Appendix 1: Areas for further research

Areas for future research include:

- **Market development:**
  - growth of soy for biofuel,
  - soy oil market development
  - development of soy food products and other derivatives from soy oil

- **Relations and tensions:**
  - comprehensive mapping of different contracting and supply relations/tensions between producers and processors
  - Investigating cross-ownership in production, processing, animal feed, and poultry across the different countries

- **Broader economic challenges:**
  - Land reform
  - Employment questions and scope for employment development
  - Linkages to other industrial activity

- **Value chain linkages with product areas not covered:**
  - oil production and processing, relationship with and nature of animal feed producers
  - mapping import and export behaviour at each stage of the value chain

- **Production and collaboration**
  - infrastructure: investment and finance, transport costs and infrastructure, availability of production inputs/knowledge
  - ranking input constraints by cost and by potential positive impact if resolved

- **Competition**
  - exploring competition from other oilseeds (sorghum, cotton, palm, canola)

- **Parallel value chains within the region (esp. SADC):**
  - import of oil through Kenya, Tanzania, Zimbabwe
  - alternative soy VC in region incl. Malawi, Mozambique, Botswana as alternative producers/(processors);
  - other crops for animal feed/biofuel/oil etc. (e.g. maize, sugar, sorghum, sunflower)

- **Policy environment:**
  - further explore the role of alternative policy agencies (SMME, agricultural support, marketing boards, government production incentives, biofuel)
  - Policy harmonisation across national boundaries, joint impact of different national policies
  - Joint bilateral or regional biofuel strategy
Appendix 2: Research methodology

This section details how the research was designed, conducted, and what challenges were experienced in the research process. The aim of the research was to explore the nature of the soy value chain through a mapping of the constraints, drivers and connections at the national and regional (Southern African) level. The research sought to map the different components of the industry, to uncover the differences and similarities across different activities in the value chains and across different countries, and to identify the existing interaction in production, processing, trade or other relevant industry activities. These insights served to investigate the current state and scope for developing regional collaboration, integration and linkages in production, processing and market development. They also provided the background to explore the potential for developing joint or overlapping policy to support the soy production and processing industry and improved supply and demand capacity into linked industries.

The research was underpinned by an understanding that each of the three countries in question was seeking to develop their soy industries in response to growth in demand through poultry production and consumption growth, but also in response to the potential for overcoming various different national challenges through the careful and coordinated leverage of existing assets and advantages. Though in the short term these are driven by the profit and firm-level development, they present the scope for the longer-term development of bilateral or regional (including but not restricted to Zambia, South Africa, Zimbabwe)-based market for the demand and supply of soy bean, cake, oil, animal feed (poultry, beef, fish and pork) and other derived or linked products such as soymilk, soy yoghurt, soy flour, gams (lecithin for bread-making), and cosmetics as the main examples.

Research questions

A set of initial research questions led the review of existing literature and the development of the fieldwork investigation and questionnaire. They were guided by the methodological structure of the global value chain approach expanded to investigate activities and influences beyond those defined through the core notions of governance, upgrading, input-output structures, and access to markets. It is important to note that not all of these questions were fully covered across the three countries. Additional areas of interest such as tensions arising from land tenure questions, issues around employment and wage costs, as well as linkages between the industry in question and related agricultural production and processing were also touched upon.

The primary research questions included

- What is the nature of the soy production-to-processing chain of activities across the three countries under investigation? This included questions about the structure and characteristics, competition, ownership, location and distribution of activities.
- What is the form and extent of any connections within and between the national industries (esp. in terms of trade, systematic input supply, access to output or auxiliary markets, joint research and development, cross-border or cross-value chain investment, transfer of skills/technology, movement of or shared employment). This also sought to explore the relations and tensions within and across the national industries, identify any nodes of control, and explore differences in perceptions.
- What are the main drivers and trends of each national soy value chain? (prices, imports/export patterns, skills/technology needs, inputs/outputs
- What are the areas for growth and chain development? Nationally/regionally?
- What is the actual and scope for regional collaboration? What are the views on the scope for regional collaboration/integration?
• What are the policy implications? What are the views on current policy: limitations and suitability?

The interviews aimed to identify issue around more specific sub-questions including:
• What are the key forms of production and processing? What is being made and where does it go (for further processing or for direct consumption)? Which products dominate the market? What are the main sources of revenue, costs, profit?
• Who are the main producers, processors (including what are the main products)
• What is driving the industry (what is the main source of revenue, what are the main items of cost, where is growth visible or envisaged?)
• What is the nature of competition or sector interaction (e.g. price competition, quality improvements, growing/accessing into to new markets, import substitution against imports from outside the Southern African region)
• What is the source of the competition? (Imports from outside region, within region, other grains/oilseeds?)
• What influences prices, product quality, production (e.g. imports, access to technology, costs of
• What is the nature of the relations and interaction within the industry, nationally, regionally and internationally (e.g. trade connection, who are the outsourcing partners, where is value-adding taking place, market access etc.)
• What is the nature of the industry ownership? (how many firms, who owns them, are they South African, do these firms own production/processing or trade partners in other Southern African countries, how concentrated is the sector?)
• What are the main constraints from the perspective of different firms (production, processing, trade)?
• What if any policies have been important or influential? Why?
• What do different industry institutions/stakeholders/experts see as the main constraints and opportunities going forward?

Though guided by the activities, drivers and constraints within the specific value chain, where possible the research also sought to investigate or at least undertake some preliminary inquiry into other research areas relevant for studies on rural agricultural production. These included questions on employment implications, obstacles, costs, issues around power especially within the value chain relations but also in terms of agricultural production, as well as preliminary investigations into the choice of agricultural production (especially the competition with other oilseeds and crops).

Research method

The research method consisted of two core components. The initial phase of canvassing and reviewing the existing theoretical and policy literature on agro-processing, land tenure, global value chains in agriculture. In addition, the literature research phase sought to capture existing empirical and policy research specific to soy production and processing, other relevant agricultural crops, and cover any literature on these themes across the three countries under investigation. These were written into a joint desktop study seeking to showcase some of the differences and similarities across the soy value chains in the three countries, as well as to identify key questions needing further investigation or substantiation.

The second phase consisted of fieldwork interviews across the three countries. These were led by the desire to verify and update the findings of the theoretical, policy and empirical literature review. The fieldwork interviews aimed to capture a range of different views within the industry and employed a qualitative approach rather than attempting to provide a quantitative set of
findings from a narrower selection of respondents.

The respondents were selected to represent different sections of the supply chain as well as interests of industry stakeholder, policy views and industry experts. Initial interviews were set up to test the questionnaire and to being to identify similarities and differences between views from the industry and those of the literature. Further interviews were identified through the individuals contacted and interviewed using a snowballing approach. This in part reflected the challenge around identifying a range of industry stakeholders beyond key processors. Though the selection of interviewees embodies some degree of selection bias, given the aim to update and substantiate existing industry insights and investigate new challenges, drivers, opportunities especially for regional collaboration, this bias was considered acceptable.

The fieldwork was guided by a questionnaire that sought to explore views from production, processing, traders, policymakers, support and infrastructure enterprises and institutions, and industry experts. The interviews were conducted by AIAS in Zimbabwe led by Walter Chambati and Sam Moyo, CSID/TIPS researchers led by Lotta Takala-Greenish covered Zambia and South Africa. Details of the findings by respondent and by theme are provided in the appendix.

**Research challenges and omissions**

One of the main conceptual challenges for this research arose from the range of relevant areas for investigation. The qualitative and investigative nature, and the differences in drivers and constraints both within and across national value chains, presented a wide set of important research questions and areas. Many were only touched upon, or acknowledged, but could not be fully substantiated in the literature review or fieldwork interviews. These are detailed in the section on further research and the conclusions. Amongst the various important influences acknowledged but not covered in the research are: questions of employment, poverty, land reform, industrial development, firm strategy, agricultural production and variation in different agricultural produce (some for food and some beneficiated easier than others).

Agriculture is traditionally seen as food source, source of demand, surplus labour and inputs to industry. With recent debates of agricultural produce as a source of industrial growth through agro-processing, a set of new theoretical and empirical questions regarding the scope of agriculture as industrial development are required. This is acknowledged but not addressed in this study. Furthermore, soy production and processing could be seen to fall under traditional food crops given both direct consumption of soy (especially oil) as well as the role of soybeans/cake in animal feed production. However, soybeans are not a traditional food crop in Southern Africa, and do not fall under the food production policies that apply to for example maize. This ambiguity presents an area for further research not addressed in this study.

Another area of research arises from policy debates. A broad literature investigating industrial policy and manufacturing (relevant to agro-processing and agro-industrialisation) debates the relative merits, appropriate forms and targeting of state and policy intervention for industrial development. These are often presented as either focusing on market-facilitation and static comparative advantage or selective infant industry or other national industry protection. An extensive literature departing from the strict neoclassical market-led theorising and policy development explores the nature and role of a variety of state interventions ranging from investment, subsidies, specific policies, procurement, input support, skills and technology development amongst others. Though this research is grounded in a structuralist and heterodox approach understanding countries, and industries, and their needs as different and requiring
different forms of support, the underlying debates are not covered in this study.\footnote{See Newman & Takala-Greenish 2013 for further details on debates around industrialisation and global value chain development.}

A final area of research, acknowledged but not explored here, is the literature that undertakes formal global value chain analyses of various commodities or products. This is an important methodological approach investigating the specific nature of:
- industry structure through a detailed understanding of industry concentration and ownership,
- control and nature of competition, new entrants, role of multinational enterprises or other outside/global players,
- access to funding/finance, technology, skills and other inputs,
- and the specific forms of upgrading in value addition, access to markets and across input and output constraints and bottlenecks.

Though the global value chain methodology informs this investigation, it is not fully employed to explore the governance, input-output structure, the nature and capture of value-addition, or the upgrading strategies (product, market, process). As explained in section 4, there are important aspects to the soy and other agricultural value chains that influence the industry outcomes and development. Issues such as tensions within the industry, the setting in terms of the national policy and economic structure that frame the industry, and key policy and economic questions around land tenure and ownership are not captured by the global value chain approach, but are nevertheless important to acknowledge and delve into.

The next sections discuss the findings of the research across the fieldwork and literature investigations in South Africa, Zimbabwe and Zambia.

These draw on the main themes of the investigation and seek to highlight the similarities and differences both across and within the national value chains. The discussion draws out key findings from each of the countries.
References


AMA, Agricultural Marketing Authority, www.ama.co.zw


Blignaut, C., Taute, M. (2010). The development of a map showing the soybean production regions and surface areas of the RSA. Department of Agriculture.


FAO (1997). Irrigation technology transfer in support of food security. FAO.


Purdue University (2013). Purdue crop cost & return guide. Purdue University.


