Analysis of the Animal Feed to Poultry Value Chain in Zambia

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Summary

The rising population, incomes, and urbanization in Africa are likely to trigger demand for agricultural produce while spurring growth of the rural nonfarm sector. Being one of the fastest growing industries in the livestock sector, the poultry industry is expected to be the largest beneficiary. Backward production linkages with the animal feed will not only benefit animal feed firms but also maize and soya beans producers. For feed and poultry firms operating in Zambia, the trends offer promise in the form of increased demand locally, and commodity exports to other countries in the region. However, the challenge is how best to improve the competitiveness of animal feed and poultry products. This article discusses Zambia’s animal feed to poultry value chain in the context of improved competitiveness. An overview of the animal feed to poultry value chain is also discussed. Using a qualitative approach, and secondary data from various sources, given that animal feed is the single largest cost for poultry production, we note that improving competitiveness of poultry products will depend on the competitiveness of animal feed products. At present, the cost competitiveness of the animal feed industry is adversely affected by inconsistent maize trade policies, unfunded value added tax, currency devaluation, power shortages, and trading in multiple currencies for animal feed inputs. There are very limited animal feed exports due to limited soya bean production. Regionally, the only realistic market Zambia can engage in is the specialized niche market, and maize exports. Soya bean exports to South Africa face competition from the cheaper and heavily subsidized imports from South America, however, there are exports to Zimbabwe, which is draining most of Zambia’s soyabean output. For animal feed, increased exports will require increased soyabean production.

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1. Introduction

Africa’s population is on the rise, urbanization is also increasing. By 2050, Africa’s urbanization will reach 60% and of the 2.5 billion people added to the World population, 90% will come from Africa and Asia. Incomes\(^2\) have rapidly increased and their growth now largely positive for most countries (Potts, 2009; U.N, 2014; Habitat U.N 2010). Similar to other countries in Africa, Zambia is also experiencing urbanization, population increases, and a growing middle-income class. Currently, the urbanization rate is estimated at 40% and this is projected to reach 58% by 2050, it is highly urbanized by Southern African standards (Tembo and Sitko, 2013; U.N, 2014). In combination, these trends are likely to trigger demand for agricultural output produced in the rural areas. This will further generate spillovers in the farm and rural nonfarm sectors via consumption and production linkages. Benefits will be highest in agriculture given that most African countries are in the early stages of development where agricultural growth plays a very important role in development.

Within the agricultural sector, the poultry industry is likely to benefit the most. It has grown rapidly in many countries in line with a growing middle-income class, increasing preference for cheaper white meat and the demographic trends. In Zambia, Mozambique, South Africa, Botswana, and Zimbabwe, poultry consumption is expected to grow at 2.8% per annum compared to 2.2% and 1.9% for pork and beef respectively for the period 2013-2022. Because the poultry industry has strong backward linkages with the animal feed industry which accounts for between 65% and 70% of the broiler production costs (Sayila, 2007; Zengeni, 2014a). Spillovers will be highest in animal feed manufacturing and associated sub-sectors\(^3\) (i.e. production of maize and soya beans which are the two main grain based raw materials used in feed manufacturing).

In Zambia, the poultry\(^4\) industry’s importance cannot be overemphasized; it contributes 4% to the gross domestic product (GDP) and makes up over 40% of the agricultural GDP (Bwalya and Kalinda, 2014). Given its strategic geographic location, relative advantage in soya beans and maize production, and the local and regional trends, there is potential for Zambia to further grow its local and export markets for animal feed and poultry while accelerating economic growth (Sayila, 2007; Zengeni, 2014a). There is also potential to trigger increases in both farm and rural nonfarm incomes particularly among the small- to medium-scale soya beans producers if production and productivity can be increased. Opportunities also exist for employment creation.

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\(^2\) The World Bank’s indicators show positive per capita income growths in the 21\(^{st}\) century for African countries, the 20\(^{th}\) century had negative growths in most cases (see [http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?display=graph](http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?display=graph)). Also see King’ombe (2015).

\(^3\) Technoserve (2011) indicate that for the period 2010-2020, 60% of Zambia’s soya bean demand will come from the poultry industry’s growth.

\(^4\) The definition of poultry includes geese, ducks, rabbits, pigeons, guinea fowls and chickens, this paper limits the focus to broiler and layer chickens.

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as firms invest to meet growing local and international demand for poultry products, animal feed, and feed inputs. However, this will to some extent depend on the nature of the regional linkages that Zambia ultimately engages in.

While some of the opportunities arising from the earlier alluded to trends are clear, the extent to which Zambia can benefit from them remains to be fully understood. Although the regional dynamics relating to competitiveness of the poultry and animal feed industries are somewhat understood (see Bagopi et al., 2014; Zengeni, 2014b), there still remain a number of important questions regarding the operations of poultry and animal feed firms within Zambia and other countries in the region. For instance, while evidence shows that some firms have invested at various levels of the animal feed to poultry value chain perhaps in response to the growing demand for inputs and poultry products (i.e. day old chicks, broiler meat, feed, and feed inputs) both locally and internationally. The drivers of such investments remain poorly understood. In Zambia, a few studies have attempted to analyse the poultry value chain, but gaps still remain especially for the layer and broiler value chains (for examples see Agriprofocus, 2015; and Bwalya & Kalinda, 2014). To be able to understand how best the opportunities that come with the regional trends can be exploited, it is important to fully understand the firm- and industry-level capabilities and competitiveness. In addition, it is imperative to also understand the constraints faced by firms both locally and regionally while identifying ways in which these can be addressed.

Against this background, this paper discusses the Zambian feed and poultry industry in the context of constraints and opportunities for improved competitiveness. We also discuss the markets where Zambia is best positioned to engage in regionally. The five main questions this paper addresses are: (1) What are the main determinants of cost competitiveness at different levels of the feed and poultry value chain?; (2) What are the main influences on, and obstacles to investment?; (3) How significant are the economies of scale at different levels?; (4) What long-term contractual or vertical integrated arrangements govern supply? and; (5) What are the competitive dynamics at different levels between producers?

The above questions are answered through qualitative data collected via semi-structured questionnaires with poultry firms, outgrowers, animal feed producers, and the industry association. These are backed by secondary data collected from various sources including the Poultry Association of Zambia (PAZ), Central Statistical Office (CSO), the Zambia National Farmers Union (ZNFU), and the Grain Traders Association of Zambia (GTAZ).

The remainder of the paper is structured as follows: Section 2 presents an overview of the Zambian poultry value chain, industry performance, trade, input sources, logistics, and the key players. It also discusses investments that have taken place, and operational challenges among

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5 Kaplinsky and Morris, (2010) define a value chain as the full range of activities that are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use.
firms. In section 3, we discuss the state of animal feed input availability in Zambia. Section 4 discusses Zambia’s prospects for a regional linkage development based on insights from sections 2 and 3. Section 5 concludes and discusses the study’s main implications.

2. Overview of the Zambian Poultry Value Chain

In this section, we look at Zambia’s poultry value chain, highlighting the main players in the animal feed and poultry industries. We also look at trends in the production and trade of poultry and animal feed products. Investment decisions, customer segments, operational challenges, and key competitive advantages. We also discuss the main challenges faced by firms operating in the industry.

2.1 Mapping the Key Players

Figure 1 shows a schematic representation of Zambia’s broiler value chain. It includes international input suppliers, primary producers, secondary producers, processors, chain stores, and consumers. Added to these, a number of support services exist, typically, these are not directly involved in poultry production.

Primary producers include hatcheries, and breeders of grandparent and parent stock. In the broiler value chain, key firms at this level include: Zamhatch, Hybrid poultry, Tiger chicks, Quantum foods (formerly Bokomo), Ross breeders, Panda hatcheries, and Chipata hatcheries. With 69% of the market shared between Ross breeders, Hybrid poultry, and Quantum foods. Except for Chipata hatcheries, all these firms own parent breeding stock. Ross breeders and Hybrid poultry are the only two firms owning grandparent breeding stock which is imported from great grandparent farms in Europe.

Secondary production of broilers is done at commercial and small-scale levels. The small-scale producers account for 65% of the broiler market. It is common for large corporate firms to enter into contracts with outgrowers and contract growers. Chickens from outgrowers and contract growers are then branded and sold by the parent firms (e.g. Southern Chicken and Hybrid poultry). Outgrowers enter into contracts partly because access to funding among them is a function of individual assets. They are given inputs on credit by contracting firms. On the other hand, contract growers are usually businesses with the ability to finance own production and only supply the final output to corporate firms. These producers largely exhibit a fragmented value chain structure (see Gooch, 2012 for value chain typologies). Vertically integrated firms in the Zambian poultry industry exhibit a collaborative value chain structure in which different units engage in mutually beneficial long term strategic partnerships (e.g. Zambeef through their Zamchick segment has linkages with its own feed production unit (Novatek), processing facilities and chain stores countrywide). Note that corporate firms are also into commercial broiler production, for instance, Zamchick and Hybrid Poultry have their own broiler farms at this level. Typically, own produced broilers may account for about 40% of processed output by a firm, the majority is acquired from outgrowers and independent contractors.
Once produced, the broiler chickens are either sold dressed or live. Of the total annual production, 65-70% is sold live while the remainder is processed. Most of the live sales occur at informal markets countrywide (with some negligible leakage into the international market especially the Democratic Republic of Congo). Suppliers of live birds on the market are mainly the small- to medium-scale producers (including households or individuals producing in their backyards).

The next level of the value chain includes processors. These process and package the broiler meat as whole chickens or cut pieces. Once processed, the broiler meat is sold in the various chain stores nationally. Some firms such as Zambeef through their Zamchick brand process and supply to supermarkets such as Shoprite or their own fast-food outlet (Zamchick Inn). They also supply to their own retail outlets countrywide. The main broiler processors include: Zamchick, Crest, Verino, Southern Chicken, Supreme Chicken, Eureka, Copperbelt Chicken, and other smaller processors. Zamchick is a segment of the Zambeef group, Supereme chickens is owned by Ross, hybrid poultry brands as country choice or Verino chicken, Galaunia farms branding as Crest chicken. The majority of the poultry processing takes place in the informal sector.
Product sales occur through the many chain Stores. Markets in this instance may be formal or informal. Formal markets include Shoprite, Food Lovers Market, Melissa, Spar and Pick ’n’ Pay, etc. These only trade in dressed chickens. Trade on the informal market includes both dressed and live birds that are usually processed by individual producers. Also note that day-old chick sales also occur through agent sales points countrywide.

A number of support services exist within the chain, these are usually not directly involved in poultry production. They include input suppliers and service providers (e.g. international suppliers of grandparent stock, feed millers, suppliers of vaccines and drugs, suppliers of sawdust, feeders, drinkers, energy, transportation, extension etc.) Others such as the Poultry Association of Zambia (PAZ) lobby for the industry members. PAZ acts as a channel through which its members table industry-related issues to government. It is affiliated to the Zambia National Farmers Union (ZNFU) which looks at agricultural issues nationwide. PAZ gives a poultry perspective to Zambia’s agricultural sector when participating in ZNFU stakeholder meetings. The main import and export facilitators are the Zambia Revenue Authority, Ministry of Agriculture and Livestock (MAL), Ministry of Health, Zambia Veterinary services, Zambia Bureau of Standards, Ministry of Commerce Trade and Industry (MCTI), and the Zambia Development Agency (which also handles investment-related issues). In addition to these, the Zambia Consumer Protection and Competition Commission is responsible for protecting consumers. In addition to facilitating imports, MAL is responsible for policy formulation in the industry.

Key firms producing animal feed include: National Milling Corporation (NMC), Novatek Animal Feeds, Tiger Animal Feeds, Nutrifeeds, Pembe Milling, Simba Milling, Olympic Milling, and Emmans Feed Enterprises. Among these, Novatek and National Milling Corporation have the largest capacities at 14-16,000 and 9-10,000 tons feed per month respectively—with planned investments in additional capacity. The range of feed produced includes poultry, rabbits, quails, fish, beef and dairy cattle.

2.2 Industry Performance

Table A1 shows trends in the animal feed and poultry industry. Over the last five years, the poultry industry has almost tripled and is expected to grow at annual rates of 8% and 10% for broilers and layers respectively. Broiler day-old chick production increased by 140%. Similarly, the production of table eggs and pullets increased by 60% and 65% respectively. Broiler meat production increased by over 140%. Consumption demand for all products also increased. Animal feed production also grew by 117% for the period 2010-2014 in line with the poultry industry’s growth.

The majority of output in the feed and poultry industry is consumed locally (i.e. 97% for animal feed, 80% table eggs, 100% broiler meat, and 99% of the pullets). This suggests that exports in the feed-poultry industry are extremely low. Annual consumption demand for broiler meat is estimated at 9.2 Kg per capita, while for table eggs it is estimated at 66 eggs per capita (PAZ, 2015c; Table A1). This is quite low when compared to Kenya (88 eggs per capita) and South
Africa (158 eggs per capita). With sensitization of the local population, per capita egg consumption has potential to grow further.

Growth in the feed-poultry industry has been driven by a growing middle income class and protectionist policies by the government. Other drivers include rising population and urbanization, changing tastes and preferences, and growth in the hospitality industry. In addition, the cost of other sources of animal protein is highly prohibiting for many consumers, and this renders poultry products more attractive. Growth has also been driven by improved supply chains and the Kwacha’s stability in the past.

Of late, production costs in the poultry industry have been on the rise due to various reasons explained in section 2.9. This poses a threat to the industry’s growth in the very short run. For instance, the average national price of day-old chicks increased from ZMW 4.71 in May 2015, to ZMW 4.8 per chick in September, 2015, with Kasama district recording an all-time high of ZMW 6 per chick. The prices of broiler and village chickens increased by 7.4% and 14% respectively (i.e. from ZMW 34 to ZMW 36.5 for broilers and from ZMW 34 to ZMW 40 for village chickens). Ex-layer prices have remained fairly constant at ZMW 32 per bird. Egg prices reduced from ZMW 23.03 to ZMW 22.87 per tray during the same period. Figure 2 shows that poultry feed prices are generally less volatile. However, for a 50 kg bag, starter feed increased from about ZMW 162 to ZMW 197 for the period June 2014 to September 2015, while grower feed increased from about ZMW 159.5 to ZMW 192. The price of finisher increased from ZMW 159.5 to ZMW187 for the same period. Among the poultry feed types, pullet feeds cost less than broiler feeds. In 2014, Pullet day-old chicks were ZMW 5.5 per bird (see PAZ, 2015a & 2015b for price trends).

**Figure 2: Trends in Poultry Feed Prices (2014-2015)**

Source: Poultry Association of Zambia.
2.3 Investments and Investment Incentives in the Poultry Value Chain

From 2012 until mid-2015, the local feed-poultry industry looked very promising from a business perspective. This growth along with a favourable investment climate triggered investments at various levels of the value chain and in animal feed production. Existing feed manufacturers expanded capacities while new firms entered the industry. Investments were also in breeder operations, feed manufacturing, and broiler processing/production. To date, investment plans are still being executed by major industry players. Following these investments, the local feed market is now saturated and no longer growing. The poultry industry’s anticipated temporal shrinkage will cause a further reduction in the cake shared by feed manufacturers. Figure 3 shows that Zambia’s trade deficit in day-old chicks has reduced from $0.6 million in 2000 to $0.4 million in 2014 due to recent investments in hatcheries. It is likely to reduce further once Zamhatch is fully operational. At full capacity, Zamhatch is expected to produce 650,000 day old chicks per week bringing it in line with the two major firms in the industry (i.e. Ross and Hybrid poultry). New investments have also increased competition among breeders and processors. With competition, consumers are likely to benefit more.

Figure 3: Zambia’s Trade in Broiler Day-old Chicks (2010-2014)

![Figure 3: Zambia’s Trade in Broiler Day-old Chicks (2010-2014)](image)


In the poultry industry, Zamhatch is the only recent entrant at the primary producer level having entered in 2013 following Rainbow chicken’s acquisition of 49% shares in ZAMBEEF. At the processor level, new entrants include Southern Chicken in 2014, Copperbelt chicken in 2014, and Supreme chicken in 2015 (owned by Ross breeders). New entrants in feed manufacturing include Emman Farming Enterprises in 2012/13, Pembe milling in 2013, current capacity expansion by National Milling, and the setting up of a 10,000 ton/month capacity feed mill in Mпонгве by Zamhatch following partnership with Rainbow chickens of South Africa.
However, while firms have invested in the industry, future investments are likely to be done with more caution. The reason for this is straightforward, investment planning is mainly a function of the Kwacha’s stability against the US dollar. Coupled with other factors, the adverse effects of the Kwacha’s high volatility of late has weighed heavily on the industry. It has come at a time when a number of firms were investing in capacity expansion while others were expanding their range of operations.

The main drivers of entry into the feed-poultry industry are firm- and time-specific. Common to these are the opportunities created by the growth of the poultry industry and the need to satisfy local demand. About 5 years ago, entry into the day-old chick business by some feed firms such as Tiger Animal Feeds (also producing Tiger chicks) was mainly driven by the shortage in day-old chicks on the local market, and the associated negative effect on poultry feed sales. As such, Tiger feeds felt the need to increase their feed sales by producing and supplying day-old chicks on the domestic market. Similarly, Zamhatch was born out of a call for day-old chicks by smallholder farmers, and the need to satisfy its own vertically integrated poultry unit (the Zamchick segment). Other firms such as Navajo Agro-minerals wanted to explore the emerging markets in Africa and beyond. In the animal feed market, entry by the vertically integrated firms was mainly driven by the need to meet internal needs. For example Novatek was set up to supply Zambeef with internal animal feed needs. Similarly, Nutrifeed was also set up to supply its own grandparent breeder farm (Ross breeders) and the domestic market. Zambeef later opened up to the domestic market, its internal feed is now only 30% of Novatek’s feed output. Other firms such as National Milling Corporation (a former parastatal) enjoyed some first mover advantage. It was the only company operating in the industry. Additionally, NMC’s entry was also driven by local demand and the fact that infrastructure was already in existence. Similarly, hybrid poultry has been in operation for over 60 years, it first started out as a broiler farm and has since expanded into one of the leading vertically integrated firms.

Firms operating in the feed-poultry industry view incentives as regressive. However, some interviewed firms received incentives from the government, especially at the time they were setting up their operations. These are mostly covered under the Zambia Development Agency (ZDA) Act No. 11 of 2006 which lists a number of incentives for firms investing in priority sectors. The Zambian government seeks to promote manufacturing-related activities as they create a large number of jobs. Hatcheries and poultry processing may be categorized under agro-processing. Depending on their location, they may qualify for both fiscal and non-fiscal incentives. Animal Feed Production on the other hand may be categorized under manufacturing. ZDA incentives under this Act are on taxes.

2.4 Barriers to Entry

Barriers to entry in the poultry industry depend on the level of the value chain at which firms operate. They are highest for the highly specialized niche markets because of the capital requirements and licenses required to trade in breeding stock. Moreover, primary producers are mainly oligopolistic in nature—within a few dominant firms—and these may operate in other countries in the region. Survival in this market also depends on a guarantee of a large market and
this also acts as an entry barrier. Agriprofocus, (2015) indicate that there is a ban on the importation of grandparent breeding stock, suggesting that entry of new firms at the primary producer level for grandparents is currently impossible. This is surprising considering that Ross breeders and Hybrid Poultry import grandparent stocks from Europe. However, this could be one of government’s protectionist policies or some form of incentive for the existing companies. Processing also requires large capital investments, but it has fewer barriers than primary production. As one goes down the value chain, the capital constraint eases off and entry becomes easier. Moreover, one does not go through complicated procedures to set up a broiler or layer operation.

Entry at the secondary producer level has very limited constraints, mainly related to less expensive capital investments. For outgrowers, entry depends on the capital requirements, only firms/individuals that can produced a predetermined minimum quantity of birds are contracted.

2.5 Customer Segments and Operations in other Countries

The range of market segments served by the Zambian feed and poultry industry stretches from individuals to local and international firms as well as government wings. Over 98% of the total feed produced is absorbed by the domestic market, the rest is exported to other countries within Africa. Feed manufacturing firms consider the local small-scale poultry producers as their main market. Internationally, animal feed exports are predominantly to specific livestock producers (i.e. Farms).

Table 1: Zambia’s Feed and Poultry Exports by Destination

<table>
<thead>
<tr>
<th>Animal Feed</th>
<th>Table Eggs</th>
<th>Day-old chicks and Hatching Eggs</th>
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<tbody>
<tr>
<td>Angola</td>
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<tr>
<td>Botswana</td>
<td>X</td>
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<td>Burundi</td>
<td>X</td>
<td></td>
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<tr>
<td>Democratic Republic of Congo</td>
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<td>X</td>
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<tr>
<td>Ethiopia</td>
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<td>Kenya</td>
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<td>X</td>
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<tr>
<td>Malawi</td>
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<td>X</td>
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<tr>
<td>Mozambique</td>
<td>X</td>
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<td>Namibia</td>
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<td>Rwanda</td>
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<td>South Africa</td>
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<td>Tanzania</td>
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<td>Zimbabwe</td>
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Source: Authors’ compilation using 2014/15 Zambia Central Statistical Office data and firm interviews. Note: X denotes export destinations for a given product.
Table 1 shows that export destinations for Zambian feed include Zimbabwe, Burundi, Botswana, Namibia, Malawi, Rwanda, South Africa, and the Democratic Republic of Congo (DRC). Animal feed exports to the DRC are mainly informal given the instability in the mineral rich Katanga province which borders Zambia. Within Zambia, feed firms also supply to breeder farms or corporate firms that are not strictly into the animal feed business. This may be done through some partnership especially with firms operating outgrower schemes. It is common practice among the large vertically integrated poultry producers to manufacture their own feed.

For hatching eggs and parent breeding stock, local companies owning grandparent breeding stock export to firms in other African countries (Table 1). Most of the parent breeding stock is sold on the local market to other firms, for example hybrid poultry and Ross breeders may supply Zamhatch with parent breeding stock. In 2014, 1,478,723 day-old chicks were exported. For the year ending September 2015, hatching egg exports were at 704,940 eggs. Export destination for the hatching eggs and breeding stock included the DRC, Kenya, Malawi, Tanzania, Mozambique, Namibia, and Zimbabwe. The market for broiler meat and table eggs includes individuals, the hospitality industry, and government departments especially defense forces, Zambia National Service, Zambia Army, and the Zambia Air Force. The same applies for the live bird sales. Some outgrowers enter into contracts with the large firms to supply live birds and these come with specific obligations in terms quality and quantity. The majority of the broiler producers sell their product on the live-sales market. This is mainly informal and takes the form of spot market transactions.

Broiler day-old chick sales are mainly to smallholder poultry producers who make up 65% of the broiler market and only 20% of the layer market. Some day-old chicks are also sold to commercial poultry producers. Layer day-old chick sales are mainly to commercial farmers (80%) with the remainder going to small-scale farmers. Day-old chicks are also sold through agent sales points, these are given conditions such as price at which they should sell. But when a firm sells directly, there are no conditions for supply imposed for the day-old chicks. About 97% of the day-old chick sales are for the local market, exports account for only 3% of the annual production. Table eggs are exported to Angola, Ethiopia, Kenya, Malawi and Zimbabwe, for the year ending September 2014, a total of 201,182,087 eggs were exported.

Because soya beans production is still low (Figure 4), most of the produced animal feed is absorbed by the local market rendering feed exports minimal (e.g. in 2014, only 3% of the manufactured feed was exported). Southern Africa has been a key market for Zambia’s animal feed with 65% of feed exports to Zimbabwe while the rest is mainly exported to South Africa, Namibia and Botswana. However, Namibia is a small market when it comes to feed and poultry. There are also traces of animal feed exports to the Democratic Republic of Congo (DRC), which are mainly informal. Data from the poultry association of Zambia shows that between September 2014 and September 2015, Zambia’s animal feed exports were at 3,360,344 metric tons, imports
on the other hand were at 558,638 metric tons\(^6\). Animal feed can be sold to individuals, firms or to segments within vertically integrated firms. Most of the exported feed is to individual farmers.

It is uncommon for feed firms to enter into contracts with customers. Trade takes the form of spot market transactions irrespective of whether it is local or international. However, some feed firms may agree to supply breeder operations for example a specified amount and quality of feed on given dates. Poultry firms operating outgrower schemes may also partner with feed firms to supply them with animal feed. This could be one of the reasons NMC and Hybrid poultry are in partnership. Trade agreements for feed also exist for the middlemen or agents. Typically, feed firms operate a fixed price system when they contract agents across the country (e.g. Nutrifeeds). Other firms such as Zamhatch specify operating procedures for agent sales points. In fact, Zamhatch is the first company to develop standard operating procedures for agents wishing to work with them. This was to ensure that the laid down quality standards were maintained, further enhancing quality across the supply chain. For the specialised niche markets such as the supply of parent breeding stock to other firms across the continent, Ross breeders for example demand that the orders are made 18 months in advance.

Vertically integrated firms usually meet their internal needs first before going into the rest of the domestic and export market. This is done particularly for animal feed and day-old chicks supplies. Agreements between outgrowers and contracting firms are firm-specific. Some firms require that anyone entering into a contract with them should produce a minimum number of birds. The contract also specifies the inputs that the contracting firm will supply to the outgrower (e.g. vaccines, feed, and day-old chicks). Inputs are supplied on credit, and the firms deduct these from outgrower sales. Added to these, while some firms may demand that birds reach a specified live-weight within a specific time, others do not place a time limit on the live-weight gain. For example, Hybrid poultry requires that anyone wishing to become an outgrower should produce a minimum of 16,000 birds, additionally one needs to grow their birds to a live-weight of at least 1.6 Kgs but no more than 2 Kgs within 35-38 days. Usually, firms collect the live birds from outgrowers, thus, contracts also specify who suffers the loss when birds die during transportation. Southern Chicken for example suffers the loss when birds die in transportation. On the other hand, Hybrid pass on the loss to the outgrower. The majority of the contracting firms discourage the use of antibiotics on the birds.

Of the feed and poultry firms interviewed, Nutrifeeds has operations in South Africa. Tiger animal feeds is a part of Meadow feeds operating in South Africa. Being 49% owned by Rainbow of South Africa, one would say Zamchick/Zamhatch has operations in South Africa. Novatek Animal Feeds have an outlet in the Democratic Republic of Congo, and also operate a feed mill in Zimbabwe. Quantum foods are also known to have operations in Uganda.

\(^6\) A longer series of animal feed trade data is provided for in Figure A4.
2.8 Key Competitive Advantages among Firms

There are a number of competitive advantages that were highlighted by firms operating in the animal feed and poultry industry. And we discuss each one of these below.

Quality of Product, and Marketing Strategies

A key competitive advantage in the animal feed and poultry industry is the quality of product. Almost all firms interviewed pointed to the quality of product as one key competitive advantage among firms. With the entry of new firms and capacity expansion by existing ones, the quality of animal feed on the market has increased, but this increase is only for firms that were producing lower quality feed.

Given the rising product quality, company strategies will most definitely focus on marketing and quality maintenance. Guaranteeing customer satisfaction, reliability, maintenance of product quality, and promotions will be key competitive advantages.

With respect to quality maintenance, Zamhatch is the only company to so far develop standard operating procedures for its agents. This will ensure there is no quality compromise, and as such the firm can focus more on market expansion. Zambian consumers have become very quality conscious and this is one of the major issues firms will aspire to maintain or improve on. In accessing international markets, there are advantages to having product quality that is internationally recognised. For example, for Novatek, being ISO 22,000 certified means that it is at an advantage in entering the export market.

Company strategies revolve around pricing. Others sell products and offer a service to appeal to the public. It is likely that firms offering a wide range of products will be more influential on the market. Good examples in this case would be Zambeef and Pembe milling who are also into food production and this puts them at an advantage over other firms. As part of the marketing strategy, engagement in corporate social responsibilities increases the reputation of firms on the local market. A good example is Zambeef and its segments who support pupils up to secondary school level. In addition, they also support a clinic and the local council by helping with grading of roads. This helps improve their image in the community.

Strategic Collabouration

To enhance their competitiveness in a highly competitive industry, firms typically focus on 2-3 key competitors who have a large influence on the industry, watching closely what they are doing and the quality of their product. For example, NMC’s partnership with Hybrid Poultry will be watched closely as it is expected to impact greatly on the industry. Similarly, Tiger Feed’s partnership with Crest Chicken will also be watched closely.

Firm Location

Firm location also impacts on competitiveness through its effect on production costs, and the ability to serve some markets. Zamhatch for instance pointed to their strategic location in
Mpongwe district as one key advantage that has greatly reduced their cost of doing business—it is strategically located to export to Angola and the DRC.

**Vertical Integration**

Vertically integrated firms have competitive advantages over non-integrated firms, in that they experience reduced costs when they are a part of large operations. A good example is a case where a firm is part of an operation with a large pool of trucks, maintenance costs on these reduce as they are able to hire staff on permanent basis. The situation is different when firms own very few trucks causing them to outsource mechanics. Additionally, with vertical integration comes increased efficiency. Vertically integrated firms are guaranteed access to the final market.

**Research and Development, and Technology in Use**

Being in a competitive business where high feed and poultry quality is vitally important, firms continuously invest in research and development (R&D). This may be for markets or products. In animal feed, the quality of grain-based inputs changes from year to year. As such, to maintain a quality product, firms must continuously conduct feed trials each year on the various livestock to be served. In general, firms found it difficult to quantify how much goes into R&D in the business. Thus firms that invest significantly in R&D will usually be at an advantage.

The type of technology being used has a direct bearing on the production efficiency. It was seen to vary especially across feed firms. Firms such as Emmans Feed Enterprises and Nutrifeeds operate computerised systems equipped with sensors which control the feed formulations and thus ensuring quality. While other firms operate manual feed production systems. Broiler producers use manual, semi-automated or automated production systems. The manual systems are mainly used by the small-scale producers. Outgrowers and other large firms can afford semi- and fully-automated production systems.

**2.9 Operational Challenges and Threats to Competitiveness**

So far, Zambia has fared well with respect to creating an enabling environment for investment. This has a direct impact on investment decisions in the feed-poultry industry. We expect that government policies aimed at encouraging investment will have a direct effect on the industry’s competitiveness as more firms enter the domestic market. When we consider the ease of doing business, only South Africa, Botswana, and Namibia have a comparative advantage over Zambia (ranked 43rd, 74th and 88th respectively), Zambia is ranked 111th (Figure A1). Figure A2 shows that the policy regime in Zambia favors registration of property, facilitating cross border trade and access to electricity. The policy regime however is a challenge in facilitating access to credit, enforcing contracts and in starting up businesses. However, while it ranks fairly on the ease of doing business, the cost of doing business in Zambia is on the rise, which will in time contribute to the uncompetitiveness of the poultry sector if not addressed.
One challenge faced by firms operating in the Zambian feed-poultry industry relates to the fact that despite being a member of the Southern African Development Community (SADC) and Common Market for Eastern and Southern Africa (COMESA) free trade areas (FTA’s), there is a lot of protectionism among SADC and COMESA member states. Free trade is very limited with import bans across the two sub-regions constraining regional trade. A good example is Zimbabwe which uses non-tariff barriers to limit feed imports and thus protect its value-added industries. However, the export of raw materials into Zimbabwe is highly welcomed. Interviewed firms did point to the fact that the veterinary department in Zimbabwe is demanding $20 per truck of animal feed, a practice which doesn’t make sense given that they are doing so on grain-based products which have nothing to do with veterinary operations. This squeezes the profits among feed exporters to this region further reducing the competitiveness as it is a marketing cost.

A challenge affecting the competitiveness of Zambian feed and poultry exports comes from the use of multiple currency denominations on the market. For example, soya beans (a key input in feed manufacturing) is traded in US$ when deposited with the large grain traders who have the capacity to store it, but the manufactured feed is traded in Kwacha. This means that with high depreciation of the Kwacha as is the case now, firms are at a disadvantage and have to pass on the exchange losses to consumers. Currency exchange volatility in this case affects operations and planning in as much as it negatively impacts competitiveness. Trading in a single currency would greatly assist in making feed and poultry products more competitive.

The load-shedding problem is also one key challenge being faced by firms. Currently, Zambia experiences 8 hours of electricity load-shedding per day. In animal feed production, load-shedding has in some cases reduced production by 30%. The very large firms in the feed industry such as Novatek view load-shedding as an opportunity to increase their sales because other firms are producing below capacity. Firms generally are adapting to this problem by acquiring alternative sources of electrical energy such as generators and inverters. Additionally, they are manipulating the shifts among workers to maximise on output in times when electricity is available. In broiler production, load-shedding even yields more challenges among the small producers operating automated or semi-automated production systems. For example, producers located in farms rely on borehole water for production, they also own storage tanks with limited capacity. Mortality rates are expected to increase because their ability to constantly supply water to the poultry houses is diminished. Manual feeding/drinking demands more manpower and this ultimately increases the operational costs. The effect resulting from load-shedding is even more pronounced among players who do not have the financial muscle to acquire other sources of electrical energy. Related to this, many broiler outgrowers have contracts to supply a specified amount of feed, which they are unable to meet due to the challenges faced by their feed suppliers.

Note that to help counteract the adverse effects of load shedding on production, the government in the 2016 budget has pledged to reduce electricity tariffs. But this is only one step towards reductions in the feed and poultry prices.
live weight at a given time. With load-shedding comes a number of challenges in meeting contractual obligations and has potential to trigger more challenges further up the value chain. The increase in commercial electricity tariffs is expected to increase fixed monthly charges from K55.09 to 156.47\(^8\). This will further reduce competitiveness of feed and poultry products on the international market. Locally, the costs will be passed on to consumers triggering a reduction in consumption demand.

Poultry producers are also faced with the challenge of having to keep up with the ever rising cost of feed. The rising feed cost has reduced the profit margins in that it is not adequately compensated for by increases in the price of broilers. Running costs have generally increased especially for producers who have migrated from fixed electricity tariffs to pre-paid systems. In some cases, commercial producers cited that feed quality is inconsistent even when sourced from a single firm. This introduces a lot of variability in bird performance. There have also been cases of delayed payments for outgrowers. This is viewed as having negative impacts on planning and production management.

Over-time, there has been heavy government involvement in the maize market through the Food Reserve Agency (FRA). These policies are seldom in line with the market forces. Firms view the FRA’s involvement in the Maize market as highly limiting especially when they set the price above the market price. A price set higher than the market price reduces the maize availability on the market as smallholder producers sell the bulk of their produce to the FRA. Moreover, evidence also suggests that there has been inconsistent application of import- and export-related policies especially in the maize market, causing prices to be highly volatile. This is perceived as one of the reasons that large scale private traders have lost their export markets and supply contracts. As a consequence, taking advantage of regional opportunities is difficult among private players particularly for maize (see Nijhoff and Chapoto, 2009). A consistent application of trade policies would no doubt assist in attracting investments and trade as firms would easily plan. While government involvement in this case is viewed as problematic, the Farmer Input Support Programme (FISP) program has led to increased maize production, with the introduction of the e-voucher system\(^9\) in the 2015/16 agricultural season, it remains to be seen how this will impact on smallholder soya beans production.

Currently, Zambia is the only country that charges 16% value added tax on all animal feed raw materials locally sourced. This is not paid back to the feed millers after processing the commodity. Ultimately, the competitiveness of poultry products and animal feed in the region is negatively affected. The export of both products can benefit if the tax was zero-rated or at least paid back to the feed millers. The government also charges 16% VAT and 25% import duty on

\(^8\)Post Newspaper (14\(^{th}\) October 2015 pp.4).
\(^9\) The government of Zambia has introduced the e-voucher system to promote diversification among smallholder farmers.
drinkers and feeders respectively, which are a cost to the majority smallholder producers who have the potential to create employment and grow the industry. Ultimately, further growth of the industry and competitiveness get adversely affected.

Despite Zambia having a stable political environment, the policy environment is slightly unclear and there are suggestions that the legislations governing the poultry industry could be improved. Up to now, Zambia does not have a reliable institutional framework governing some aspects of the poultry industry, even though firms did state that the industry is generally well regulated. Regulatory requirements are in the process of being updated\(^\text{10}\) as they date back to the 1950’s. However, this process is reported to be taking too long. An example is the delayed enactment of the Livestock Development Act. This has been dragging since the time of the Movement for Multi-Party Democracy (MMD). Currently the Sanitary and Phytosanitary (SPS) legislation in Zambia is not fully developed. Breeder operations are governed by the veterinary institutions. The Public Health Act governs most of industry but this in itself doesn’t offer much hope to the industry players. Most regulatory wings have commercialized their role in the industry. A good example is the Zambia Medicines Regulations Authority (ZAMRA) who are demanding 2% of invoice value on premixes imported by feed manufacturers. This has been viewed as inappropriate in that no industry impact assessment was done which is a violation of company protection act. The feed industry seems to be self-regulatory because of the high competition levels. Some guidelines for example exist on the classification of raw materials (i.e. what constitutes soya cake, etc.). Another challenge faced by firms relates to the high degree of overlap among agencies responsible for regulating the industry which creates inefficiencies in the system. This creates confusion regarding who is mandated to do what. In summary, the current institutional framework does not give the private sector the peace they deserve for their operations. Improvements to the system would benefit the industry in the long run.

The availability of soya beans on the market also came out as an issue negatively impacting operations. This has mainly been caused by the fact that a number of local soya beans traders prefer to sell to Zimbabwean traders who offer higher prices than the local spot market prices (i.e. between $480 and over $500 per ton compared to $460 per ton when contracted locally). The resultant shortage and associated price rise will more likely be passed on to the final consumer following increases in feed production costs.

In addition, council levies have been viewed as negatively impacting the industry’s performance. The practice locally has been such that each district charges levies on crop output crossing its boundaries into other districts, and at the markets\(^\text{11}\). There are proposals by local councils to introduce livestock levies. The argument has been that these levies which are typically collected

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\(^\text{10}\) Consultations on the Livestock Development Acts under development are still going on in Zambia. The acts under consultations include the Livestock Development Act, the Livestock Development Policy, the National Livestock Breeding Policy, the Animal Health Strategy, and the Livestock and Fisheries Development Strategies.

\(^\text{11}\) Market levies amount to ZMW 3200-5000 per annum and these are charged for traders selling poultry and other products.
by the district councils are not ploughed back to foster growth in agricultural productivity. As such, they are viewed as contributing to the reduced competitiveness of Zambia’s animal feed, feed inputs and poultry products.

3. The State of Animal Feed Input Availability

Since animal feed is the single largest cost in poultry production, analysing the state of animal feed inputs is important. The main inputs for animal feed production include Soya beans, Maize, and premixes. Other inputs include wheat bran and sunflower but these account for very little of the final product (e.g. Sunflower may only be 3% of the feed formulation). Grain-based raw materials are sourced from smallholder and commercial farmers and there is no single supplier for these inputs. The vertically integrated firms such as Novatek (of the Zambeef group of companies) get some of their raw materials from their own farms. Micronutrients are usually imported and these imports come from specific suppliers in South Africa.

Figure 4: Trends in Soya beans production and yield (2003-2015)

![Graph showing trends in Soya beans production and yield (2003-2015)](image)

Source: Central Statistical Office, Crop Forecast Surveys.

Figure 3 shows that for the period 2003-2015, soya beans production increased over four times from 42,119 metric tons in 2003 to 226,323 metric tons in 2015 despite having declined in 2014. At the same time, maize production also increased from 1,157,860 metric tons in 2003 to 2,618,221 metric tons in 2015 (Figure 5). However, while Zambia usually has a surplus of maize production, the presence of significant amounts of soya beans imports in the majority of the years suggests that production has in the past fallen short of local demand for the period in question (see Figure 5).

Figure 5: Trends in Maize Production and Yield (2003-2015)
Most of Zambia’s soybeans is used in stock feed manufacturing. In 2012, demand for soybeans was at 326,978 metric tons while supply was at 302,054 metric tons (Mofya-Mukuka, Chisanga and Lubungu, 2014). The deficit in soybeans production in the past is perhaps one of the major reasons imports were high between 2000 and 2011. However, due to increased local production, the soybean imports have declined and the country is now self-sufficient (Figure 5; Kyriazis, 2015). In the year 2000, the majority of Zambia’s soybean imports came from Zimbabwe and Malawi. The picture changed in 2011 with imports coming mostly from South Africa, Malawi and Pakistan. Imports from Zimbabwe dropped drastically due to the reduced production following the land reform program that pushed the white commercial farmers out of production post 2000 (Table A2).

The productivity of both maize and soybeans among smallholder farmers is still low despite marginal improvements and this has had an adverse effect on the competitiveness of the poultry feed sector. Currently average yields for both crops stand at 1.75 tons per hectare with potential to reach 2.7 and over 2 tons per hectare for smallholder soybeans and maize respectively (Figures 5 and 6; Mofya-Mukuka, Chisanga and Lubungu, 2014).

\[12\] Figure 5 shows that between 2000 and 2011, soyabean imports declined by about 76% (from 5,311,384 tons in 2000 to imports 1,257,749 tons in 2011).

\[13\] Note that the central statistical office does not produce a food balance sheet for soyabeans. We rely on stakeholder information for this conclusion. While Mofya-Mukuka, Chisanga and Lubungu, (2012) cite a deficit, Technoserve, (2011) and Kyriazis, (2015) point out that Zambia is self-sufficient with respect to soyabeans but the demand from Zimbabwe might create shortages.
Zambia’s maize exports have been rising due to increased local production. In the 2000’s, exports were at 6,767 metric tons and this increased to 75,533 metric tons in 2014. Table A3, shows that most of Zambia’s maize exports in 2000 were destined for the Democratic Republic of Congo and South Africa, with some exports to Zimbabwe, Botswana and Burundi. By 2005, maize exports to Zimbabwe had increased substantially mainly due to the adverse effects of the land reform program. It now stands as the main export destination for Zambia’s maize together with Malawi and Mozambique. For the 2015-2016 marketing period, there is likely to be strong export demand for Zambia’s maize from Malawi, Mozambique, Namibia and Zimbabwe.

Source: Central Statistical Office
4. Zambia’s prospects for a regional linkage development

Because of the challenges being faced by firms in the industry, the specialised niche markets offer promise for regional trade in the poultry industry. As one goes down the poultry value chain, there are more players in the market and non-tariff barriers kick in. There is a lot of protectionism across countries via import duties to the extent that there is no ‘truly’ free market between Zambia and her immediate neighbours. Opportunities exist for exports of animal feed into Zimbabwe given that Harare is located far from Johannesburg when compared to Lusaka. But this would be predominantly for raw materials given Zimbabwe’s protectionist policies for its value added industries. Animal feed exports would only be significant if there was a ‘truly’ free trade zone.

Export of soya beans to South Africa is currently impossible because of the cheaper and heavily subsidized soya beans from the South American countries (i.e. Brazil and Argentina) with which Zambian soya beans cannot compete. While it is a possible market, Zambia is currently not set up to compete because of the high cost of doing business and the fact that Zimbabwe is currently draining most of its soya beans leaving very little for export to other destinations across Africa. To change the regional dynamics in this respect, there is need to improve local production and productivity. Production will only increase if the commercial farmers are involved. Even with the launch of government’s e-voucher programme for the 2015/2016 agricultural season aimed at promoting diversification by increasing farmer access to other inputs such as soya beans, it will take decades for the many smallholder producers to significantly increase their productivity and contribute greatly to national soya beans output.

One other key competitive advantage that the Zambian feed firms have in the region is that where GMO products are not allowed (e.g. Zimbabwe), Zambia can export there because South African products which would be cheaper are not allowed. Again the dynamics would change if Zimbabwe relaxed its GMO policy. Given that Zimbabwe uses non-tariff barriers on Zambia’s feed, one way to get around this is to increase the competitiveness of local feed by addressing some of the challenges that contribute to the high cost of feed production. This is very possible considering that Novatek currently exports such high value commodities to Zimbabwe (perhaps because they already operate a feed mill there and because of their relative size).

The distance to Tanzania makes exports unattractive, except for the Southern-most part of the country. Botswana is self-sufficient through South Africa, as such exports to Botswana would account for a small share. Malawi’s poultry sector is small and is served mostly by its own feed-poultry industry. Namibia is promising in that it has Maize shortages, but the population is still low. Exports to Mozambique are unlikely given the Latin American influence on the local poultry industry. Mozambican’s are more likely to trade more with Brazil. The Democratic Republic of Congo (DRC) on the other hand is a highly potent market. But the systems in the DRC deter firms from crossing the borders because armed fighting is frequent in the mineral rich Katanga province. Instead, Zambian firms prefer to export unofficially by delivering to
Congolese traders on the Zambian side of the Kasumbalesa boarder. It seems unlikely that this situation will change in the near future. The only firms who can trade directly in the DRC are those with a very large financial muscle to influence the systems in the DRC. Angola offers an opportunity for trade if the railway network through North Western Zambia is completed, but similar to Mozambique, the Portuguese influence via Brazil is likely to be a major factor negatively impacting trade with Zambia. Currently, the rail-line construction to Angola is still in planning stage and it would be interesting to see how this will influence firm location and international trade.

Evidence also suggests that competitiveness on the international market for feed and specialized niche markets is dependent on where firms locate within Zambia. In India, Foster and Roseinzweig (2003) have previously shown that firms locate in areas where labour is cheap. In the Zambian case, most feed and poultry firms are concentrated around Lusaka, where wages are higher than the rural areas. Of late, large firms are locating in the rural areas (e.g. Southern Chicken, Emman Feed Enterprises, and Zamhatch). Zamhatch and their planned feed mill construction in Mpongwe are a particularly good example. The geographically strategic location has had the effect of reducing the cost of doing business overall. As such, Zamhatch and its feed mill in Mpongwe are well positioned to compete with Brazilian chicken coming into the DRC while supplying feed to the same market. It is also at an advantage to export to Angola.

Because the poultry industry is governed by the availability of and amount of disposable income, further growth of the local and regional feed-poultry value chain will require policies that increase the incomes of the people. A stable Kwacha against the dollar will assist investment planning among firms. One way is to make the industry more attractive for the small-medium firms as these will employ a large share of the people triggering a virtuous cycle that ultimately increase incomes among the population. Generally, policies that put income into the pockets of the local people would benefit the industry as a whole. The local industry would also benefit from grant finance for infrastructural development (i.e. road networks, and bulk storage facilities).

4. Conclusion and main implications

This study sought to analyse Zambia’s feed and poultry industry focusing on ways in which the competitiveness of poultry products can be improved. Results show that the industry tripled over the last five years. The rapid growth experienced by Zambia’s feed and poultry industry is a direct consequence of favourable policies, changing tastes and preferences, a growing middle-income class, increased urbanization, and population increases.

Our analysis reveals that a number of issues need to be addressed for Zambia to benefit from the regional trends. In summary, increasing competitiveness will come from improved production efficiencies. This will require firstly reducing the input costs (especially for manufactured feed), and training of the many small- to medium-scale producers in the industry. Seeing that feed is the single largest cost among the poultry producers, it is not surprising that most interventions
aimed at improving competitiveness start from reducing the costs of animal feed. Reducing feed costs will require trading in one currency for inputs (especially soya beans) and manufactured animal feed, paying back VAT to feed manufacturers, and ploughing back council levies to promote agricultural growth. Improved competitiveness will also come from increased commercial production of soya beans. Costs can also be reduced by encouraging investments in local production of the imported equipment and premixes to deal with currency exchange risks.

For products transported by road or rail, competitiveness can be improved through investments in road/rail infrastructure. Investments in storage infrastructure will also come in handy given that firms do not have the capacity to store soya beans and maize. Lastly, firms can also reduce the cost of doing business by locating such that they are closer to a target market or cheap sources of inputs. Because animal feed prices and investment planning are largely affected by currency deteriorations, success will also depend on the Kwacha’s stability against the dollar. The Zambian poultry industry is one of the best regulated in the sub-region, but this does not mean that the legal framework cannot be improved. Further updates to the existing regulations on would increase investor confidence and attract more investors in the industry. Encouraging investments by firms producing poultry-related equipment would also greatly benefit the industry as these are mainly imported and subject to exchange rate volatility.

From a regional linkage perspective, the specialised niche market is the only realistic option for Zambia. There is potential for animal feed trade if soya beans production and competitiveness can be increased. Otherwise trade will mostly be in raw materials particularly maize. Trade barriers will be central to the trade process. Zambia needs to improve the competitiveness of its animal feed for it to compete with Zimbabwean crushers. To alter the regional dynamics relating to feed, there is need to increase commercial soya beans production. Currently, the countries in which Zambia exports feed still have small populations, population growths in these areas offer promise for the future (e.g. Namibia and Botswana).

References


Appendices

Appendix 1: Tables and Figures

Table A 1: Production and Demand Trends for Broilers, Pullets Table Eggs, Feed, and Day-old Chicks (2010-2014)

<table>
<thead>
<tr>
<th>Year</th>
<th>Broiler Day-old chicks</th>
<th>Pullets</th>
<th>Table Eggs</th>
<th>Broiler Meat (Metric tons)</th>
<th>Animal Feed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Production</td>
<td>Domestic</td>
<td>Production</td>
<td>Domestic</td>
<td>Production</td>
</tr>
<tr>
<td>2014</td>
<td>73,936,149</td>
<td>72,457,426</td>
<td>2,045,625</td>
<td>2,043,579</td>
<td>1,005,910,434</td>
</tr>
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<td>2013</td>
<td>69,035,081</td>
<td>67,654,379</td>
<td>2,483,328</td>
<td>2,480,845</td>
<td>1,061,994,267</td>
</tr>
<tr>
<td>2012</td>
<td>58,515,068</td>
<td>57,344,767</td>
<td>1,974,483</td>
<td>1,972,509</td>
<td>821,477,349</td>
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<td>2011</td>
<td>41,925,612</td>
<td>41,087,100</td>
<td>1,420,167</td>
<td>1,418,747</td>
<td>625,961,250</td>
</tr>
<tr>
<td>2010</td>
<td>30,718,722</td>
<td>30,104,348</td>
<td>1,236,611</td>
<td>1,235,374</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Poultry Association of Zambia. Note: Practically all broiler meat produced is consumed locally, as such, the domestic/export breakdown is not done.

Table A 2: Soya beans Imports by Source (2000-2011)\(^\text{14}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada</th>
<th>China</th>
<th>DRC</th>
<th>Japan</th>
<th>Kenya</th>
<th>Korea Republic</th>
<th>Malawi</th>
<th>Mozambique</th>
<th>Pakistan</th>
<th>South Africa</th>
<th>Vietnam</th>
<th>Zimbabwe</th>
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<td>1.00</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3,138.17</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>0.10</td>
<td>19.36</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5,719.81</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>0.24</td>
<td>1.20</td>
<td>81.41</td>
<td>525.97</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
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<td>2003</td>
<td>0.06</td>
<td>568.27</td>
<td>0.02</td>
<td>2,568.47</td>
<td>0.88</td>
<td>10.47</td>
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<td>2004</td>
<td>747.80</td>
<td>40.00</td>
<td>525.97</td>
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<td>2005</td>
<td>0.04</td>
<td>7,128.85</td>
<td>81.41</td>
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<tr>
<td>2006</td>
<td>0.99</td>
<td>1,350.00</td>
<td>2.17</td>
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<td></td>
<td></td>
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<td>2007</td>
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<td>2008</td>
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<td>31.02</td>
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<td>2009</td>
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<td>150.00</td>
<td>34.85</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td>27.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2011</td>
<td>55.50</td>
<td>589.50</td>
<td>191.41</td>
<td>192.12</td>
<td>92.00</td>
<td></td>
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Source: Central Statistical Office

\(^{14}\) Excludes some minor sources of soya beans.
Table A 3: Maize Exports by Destination (2000-2014)\(^{15}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Angola</th>
<th>Botswana</th>
<th>Cameroon</th>
<th>Congo</th>
<th>DRC</th>
<th>Kenya</th>
<th>Malawi</th>
<th>Mozambique</th>
<th>Namibia</th>
<th>South Africa</th>
<th>Tanzania</th>
<th>Zimbabwe</th>
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<tr>
<td>2000</td>
<td>292.5</td>
<td>45.0</td>
<td>5,636.4</td>
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<td></td>
<td>612.1</td>
<td>35.0</td>
<td>44.5</td>
<td></td>
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<tr>
<td>2001</td>
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Source: Central Statistical Office

\(^{15}\) Note that this excludes minor countries.
Figure A1: How Does Zambia Compare on the Ease of Doing Business in Sub-Saharan Africa?

Figure A 2: Zambia’s Ranking on the Ease of Doing Business by Activity

Figure A 3: Zambia’s Animal Feed Trade (2010-2014)