Characteristics of Markets for Animal Feeds Raw Materials in the East African Community: Focus on Maize Bran and Sunflower Seed Cake
CHARACTERISTICS OF MARKETS FOR ANIMAL FEEDS RAW MATERIALS IN THE EAST AFRICAN COMMUNITY:

FOCUS ON MAIZE BRAN AND SUNFLOWER SEED CAKE

KILIMO TRUST, 2017
About REACTS

The mandate of REACTS project is to enable agricultural development projects in the EAC Region to align, build core skills, and work with relevant partners in enabling business enterprises of smallholder producers to respond effectively to regional markets for food products and by-products, in the East African Community (EAC) Common Market of nearly 160 million consumers.

This study contributes to the output on increasing understanding of regional markets.

About this Report

The report presents statistics and characteristics of animal feeds industry and markets for raw materials specifically maize bran and sunflower oil seed cake in the East African region. This is with an aim to inform beneficiaries of IFAD projects principally and other stakeholders generally to better take advantage of existing markets for these raw materials nationally and regionally.

Disclaimer

The views and conclusions contained in this report are entirely those of the authors and do not necessarily reflect the policy and views of Kilimo Trust or IFAD.

Citation

Executive Summary

Key Findings:

1. Demand and Supply of Animal Feeds in the EAC.
   - In 2014, Kenya, Tanzania, and Uganda, the countries with the largest livestock industry in the region had a demand for animal feeds amounting to 6 million MT against production at only 1.7 million. This demand is expected to increase by 60% by 2020. As at 2014, the biggest demand for animal feeds was in Kenya, the country with the largest and most dynamic animal feeds industry. However, future demand will be informed by Tanzania which will take up around 70% of the total projected demand.

   - Collective deficit in animal feeds in Kenya, Tanzania and Uganda stood at 8 million MT and 5.3 million MT in 2013 and 2014 respectively against a backdrop of increasing demand during the same period. Ironically however, according to formal statistics in 2013, the three countries produced 1.36 million MT of cereal brans against a utilization capacity of 1.1 million MT while there was a surplus of 209,000MT of oil seed cakes.

   - Increasing demand for animal feeds is driven by a need to produce more livestock products whose demand in the region has been following a similar trend. Specifically, demand for poultry feeds is on an upward trend following increasing demand for poultry products at an average of 11% annually. As at 2014, poultry feeds constituted 64%, 96% and 60% of all animal feeds demanded in Kenya, Tanzania and Uganda respectively.

2. Trade in Bran and Oilseed cakes as raw materials for manufacture of Animal feeds in the EAC
   - An average of 7,900MT of maize bran and 766MT of soya bean cake was imported into the EAC annually between 2011-2015. Maize bran constituted
93% of the total imports while the rest was in form of soya bean cake. Kenya took up around 70% of the total lot. While soya bean cake is imported from Netherlands, USA, India, Malawi and Zambia, maize bran is imported from USA and India.

Around an average of 204,138MT of bran, 70% of which was in form of wheat bran and 66,649 MT of oilseed cake mainly in form of sunflower seed cake was exported from the EAC annually between 2011 and 2015. Tanzania and Kenya led in exportation of wheat bran while the same was the case for the former country at 93% and Uganda in exportation of sunflower seed cake. Brans were destined for United Arab Emirates, India, Oman and Egypt while sunflower seed cake was exported to United Arab Emirates, Pakistan and Italy.

Intra-regional export of brans-from maize and rice-is dominated by Uganda and that of sunflower seed cake by Tanzania. Kenya was the biggest importer of bran and sunflower seed cake from her regional counterparts in 2013, sourcing 25,848 MT of maize and rice bran and 29,534 MT of sunflower and cotton seed cake from Tanzania and Uganda. However, in 2015, there was reduced trade in cereal brans with Uganda taking lead at 14,210 MT while the opposite was the case for oil seed cake with Tanzania shipping the largest share amounting to 38,114 MT to her regional counterparts.

3. Characteristics of Animal feeds Processors in the EAC

Animal feeds processors in Uganda and Tanzania use more of locally produced sunflower seed cake than their counterparts in Kenya who in their part utilize more of maize and rice brans to produce animal feeds. This is consistent with relative productive capacities of the raw materials by these countries- sunflower seeds, maize and rice whose by-products are used by animal feeds processors.

Across the region, there is high level of informality and poor coordination in the animal feeds industry a factor that contributes to poor quality assurance of animal feeds raw materials and finished products. This is especially so for Uganda where animal feeds have been found to have levels of aflatoxins of
up to 15ppb higher than the EAC agreed 10ppb. On the other hand, farmers in Kenya are challenged with unverifiable nutrient composition, presence or absence of substances that may be harmful to human and animal health.

- On average, processors of animal feeds in the region utilize about 44% of their installed processing capacity and by extension, only about 45% of their storage capacity. This is attributed to raw materials supply constraint in the quantity and quality fronts. Also, there is low demand for animal feeds as a result of high costs of the same.

4. Prospects for Regional Trade in Raw Materials for Animal Feeds in the EAC

- Around 64% and 33% of animal feeds manufacturers in Kenya and Uganda respectively are willing to source for sunflower seed cake and maize bran regionally. This is due to on supply constraints locally and an ever increasing demand for animal feeds from an equally expanding commercial livestock industry in respective countries.

- However, sourcing for animal feeds raw materials regionally is constrained by high costs and bureaucracy in doing so. Specifically, high cost of sunflower seed cake is due to inter alia fragmentation of production and long distances between production hubs and where animal feeds manufacturers are located.
## Challenges and Proposed interventions to improve Animal feed Industry in EAC

### 1. Limited supply of raw materials for manufacture of animal feeds (quality and quantity)
- Develop strategies for increasing production of raw materials. This may include, development of high yielding-early maturing varieties.
- Leveraging structuring of the value chains to ease flow by linking producers of raw materials or primary oil processors with animal feeds processors especially for the former to consider animal feeds industry as a viable alternative market.
- Create awareness and build capacity of producers and food processors in better management of maize, rice and sunflower seed raw by-products to preserve quality.
- Remove any bottleneck and provide fiscal incentives for regional trade in raw materials for animal feeds.

### 2. Insufficient Regulatory and policy environment
- Establish or strengthen in-country regulatory mechanisms to develop or enforce minimum quality standards for raw materials for animal feeds manufacture and final products.
- Harmonize feed standards across the region to facilitate intra-regional trade.
- Research and development on production and handling of animal feeds to inform decisions and policy.
- Train a crop of experts in feed formulation & manufacture and decentralize feed testing laboratories.

### 3. Limited Organization of the animal Feeds Industry
- Introduce a set of fiscal incentives to attract big investors necessary to structure the animal feeds industry.
- Promote creation of and/or build capacity of industry associations to offer a self-regulatory framework for quality assurance as well as advocate for better business environmental systems for Good Manufacturing Practices, quality control and auditing.
- Develop a modus operandi for sampling of raw materials for animal feeds.
### Executive Summary

#### 6. SWOT Analysis of the Animal Feeds Industry in the EAC

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Un-utilized processing capacity for possible expansion</td>
<td>1) Increasing demand for feeds both within a country and regionally due to growth in livestock production caused by commensurate increase in demand for animal products in the region</td>
</tr>
<tr>
<td>2) Availability of sources of raw materials and market (livestock keepers who are their customers)</td>
<td>2) Implementation of the EAC-Common Market to facilitate regional trade in feeds raw materials and finished products</td>
</tr>
<tr>
<td>3) Low maintenance milling machines that result in low production costs of small-scale feed processors who are the majority.</td>
<td>3) Entry of big players like maize millers into the animal feeds sector offers some hope for structuring of the industry</td>
</tr>
<tr>
<td>4) Fiscal rebates in some countries (Rwanda and Kenya) for importation of raw materials</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Manufacturers have limited technical skills to formulate and produce high quality compounded feeds</td>
<td>1) Lack of /inadequate or poor implementation of regulatory framework of quality standards for feed ingredients has pushed out some processors who deal in genuine and high quality ingredients out of business and disincentivized new investments. Where a regulatory framework within a country exists eg in Kenya, there is no harmonization with other EAC which is a factor that constitutes a NTB.</td>
</tr>
<tr>
<td>2) Highly cost of raw materials for animal feeds</td>
<td>2) Poor road infrastructure which increases costs of sourcing for raw materials</td>
</tr>
<tr>
<td>3) Idle installed storage and processing capacity constitutes sunk costs for processors</td>
<td>3) Limited if any support services: eg, extension, credit and technical information to raw material producers.</td>
</tr>
<tr>
<td>4) Weak or absent industry associations to advocate for holistic improvement of the animal feeds and allied sub-sectors.</td>
<td></td>
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<tr>
<td>5) Limited availability of raw materials and inefficient procurement procedures</td>
<td></td>
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<tr>
<td>6) Poor technologies in producing raw materials especially cakes that limit their usability for manufacture of animal feeds</td>
<td></td>
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<tr>
<td>7) Poor quality (e.g high aflotoxin and moisture content levels) of raw materials for animal feeds</td>
<td></td>
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<tr>
<td>8) High fixed transaction costs owing to limited scale in procurement of raw materials and sale of finished products coupled with information asymmetry.</td>
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</tbody>
</table>
7. Conclusion

Maize bran and sunflower seed cake are important ingredients that provide energy and proteins respectively, in manufacture of animal feeds in the EAC. However, despite comparative advantage in production of sunflower seed cake and maize bran by Tanzania and Uganda coupled with increasing demand for animal feeds induced by expanding commercial livestock sector in the region, the animal feeds subsector not optimally reaped from these dividends.

This is due to high level of fragmentation of the supply and demand sides of these raw materials especially on a regional front. The animal feed subsector also suffers from non-coordination nationally and regionally which results to limited representation in formulation of favourable policies and lack of self regulation especially as regards quality of raw materials and finished products.

Increasing demand for animal feeds against a backdrop of inelastic supply of the same has pushed prices of animal feeds high above the reach of many livestock keepers, a factor that has also contributed to stagnation of the sector. In deed, it is ironical that the regional is a net exporter of these vital raw material

Therefore, unless these bottlenecks are addressed, the animal feeds industry will continue to lag behind besides a continued drain of raw materials—sunflower seed cake and maize bran—to more lucrative markets such as Middle East. This will result to increased importation of animal products in the region that should otherwise be produced within the region, further driving the animal feeds industry into the pit of uncompetitiveness and drain of the much needed foreign earnings by EAC Partner states.
Report Outline

- Executive Summary
- Acknowledgment
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- Study Areas
- Key Findings
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  - Trade in Brans and Oil Seed Cakes in the EAC
  - Characteristics of Animal Feeds Processors in the EAC
  - Prospects for Regional Trade in Maize bran and Sunflower Seed Cake in the EAC
  - SWOT Analysis of the Animal Feeds Industry in the EAC
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The authors would like to thank all the organizations, private companies and individuals who provided data and information that went into developing this report. Kilimo Trust would also want to thank IFAD for funding this study.
Introduction

There is a rapid increase in demand for animal feeds in the EAC driven by a burgeoning commercial livestock production as a result of increasing demand for animal based products. Diminishing grazing land is also forcing people to gradually shift from open grazing to semi-grazing and zero-grazing, which entails use of animal feeds other than pasture. Livestock population in EAC (South Sudan inclusive) stands at 70.8 million cattle, 74 million goats, 45 million sheep, 4.8 million pigs and 133 million chickens.

However, the region struggles with low production of raw materials such as cereal bran and oil seed cakes—the interest of this study—despite the region having pockets of comparative advantage of production of maize, rice and oil seeds. Also, in some instances, there is a disconnect in the supply chain between maize, rice and oil seed processors that results in wastage/misuse of the much needed raw materials.

It is against this backdrop that IFAD commissioned Kilimo Trust to conduct a study to provide evidence on demand and supply dynamics of cereal bran and sunflower seed cake. In addition, the study was meant to assess the market size for these products in a bid to explore possibilities of increasing production and forging regional trade in the same to benefit partners—especially smallholder farmers working with IFAD projects in the EAC region.

The study was conducted in four of the now six EAC Partner States: Kenya, Rwanda, Tanzania and Uganda.
Methodology and limitations of the study

<table>
<thead>
<tr>
<th>Review of Secondary data and Literature</th>
<th>Primary Data Collection</th>
<th>Data Analysis</th>
<th>Report writing and validation</th>
</tr>
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<tbody>
<tr>
<td>Literature and secondary data on supply and demand dynamics of maize bran and sunflower seed cake in East Africa was collated to produce a draft report. From the draft report, gaps to inform primary data collection were identified.</td>
<td>Data was collected from a sample of animal feeds processors in Uganda, Kenya, Tanzania and Rwanda</td>
<td>Both qualitative and quantitative analysis: Excel and SPSS techniques were used to analyze primary data.</td>
<td>A final report was generated from secondary data and literature and results from analysis of primary data. The report was then validated by key industry players.</td>
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Limitations:

- Primary data was not collected in Burundi due to the political instability in the country at the time of the study.
- Only a limited number of animal feed processors were visited because most of them were informal and located in remote areas of the countries of study where the team could not access due to limited time and finances. In addition, some large scale processors were unwilling to be interviewed.
- Information on volumes sold to different markets and costs incurred in animal feeds trading was hard to come by as actors did not feel comfortable sharing that kind of information.
- There was only one animal feed processor who was interviewed in Rwanda, thus this report largely used secondary data available for Rwanda.
The study areas were selected purposively based on prior knowledge of where animal feeds processors are located in each country.
Key Findings
Demand and Supply Dynamics of Animal Feeds in the EAC

Demand in the EAC was ~6 million MT in 2013 of which 62% was in Kenya.

By 2020, demand for animal feeds is projected to increase by 60% to reach 13.7 million MT.
In 2014, Kenya, Tanzania and Uganda, had the largest animal feeds demand amounting to 6 million MT. This was against production of only 1.7 million MT implying a deficit of 5.3 million MT. By 2020, demand for animal feeds in the EAC is projected to increase by more than 60%.

Kenya has the largest and most dynamic animal feeds industry characterised by intensive dairy and poultry production. The number of livestock feed manufacturers in the country increased by 50% in 2013 from 100 in 2008. However, the industry is constrained by limited raw materials: maize and rice bran, oil seed cakes and others resulting to importation of the same from Uganda, Tanzania and India.

Tanzania has the largest cattle and poultry stock in the EAC but majorly under extensive system thus demand for animal feeds has until recently been low.

Despite growing poultry, dairy and piggery industries, lack of quality and certification mechanism in Uganda has served to discourage formal investment in the animal feeds industry while encouraging mushrooming of informal small-scale producers.

*Data for Tanzania was missing*
Animal feed deficit in Kenya, Tanzania and Uganda (Production + Imports) less (Exports + consumption) in 2013

<table>
<thead>
<tr>
<th>Quantity (000MT)</th>
<th>Kenya</th>
<th>Tanzania</th>
<th>Uganda</th>
</tr>
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<tbody>
<tr>
<td>-500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1,000</td>
<td>-2,248</td>
<td></td>
<td></td>
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<tr>
<td>-1,500</td>
<td></td>
<td>-1,685</td>
<td></td>
</tr>
<tr>
<td>-2,000</td>
<td>-3,500</td>
<td></td>
<td>-4,201</td>
</tr>
<tr>
<td>-2,500</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>-3,000</td>
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<td>-3,500</td>
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<td>-4,000</td>
<td>-4,500</td>
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</table>

The three East African countries of study had a combined deficit in animal feeds amounting to ~8 million MT in 2013 with Uganda taking up half of the lot. In addition to increasing number of livestock in Uganda driven by growing demand for animal products, this could also be explained by low feed production as a result of stiff competition in the dual system of small-scale and large-scale feed producers. Limited access to locally produced feedstuff compounds the problem.

Kenya has the biggest commercial livestock industry in the EAC:

- 307 registered companies with well established large-scale animal feeds processors to supply the burgeoning industry.
- In comparison, Uganda has 112 followed by Tanzania with 79.
- Rwanda and Burundi have 8 and 2 registered animal feeds processors respectively. (See appendix 1 & 2).

Even though feeds are expensive constitute at least 70% of total production costs for livestock farmers, the small animal feed industry in Rwanda and Burundi has resulted into a small feed demand.

Maize products: grain and bran are used as a major ingredient in animal feeds production in East Africa—to the extent of 53% and between 50%-65% in Tanzania and Kenya respectively. Implicitly, maize supply constraints both in quality and quantity is replicated in the animal feeds industry. Due to principally reliability on rainfall for maize production in the region, there is erratic supply and variations in price which makes the animal feeds industry less reliant on domestic supply of maize based raw materials.
Therefore, interventions geared towards increasing availability of maize products will have a positive multiplier effect in the animal feeds industry. Structuring of an otherwise fragmented maize value chain will also be critical in ensuring a constant flow of raw materials from suppliers to animal feed producers. However, cognizant of the overriding demand for maize as food, exploring other sources of energy rich raw materials that are not necessarily used as food would be a viable option for the long term sustainability of the animal feeds industry.
MARKET SIZE - Deficit in Animal Feeds in the EAC

Consistent with the fact that bran (mainly from maize) is the biggest constituent of energy based animal feeds formulas, there has been a consistent growth in supply of the same reading 1.4 million in 2013. However, there was inconsistent growth in production of sunflower seed cake oil reaching 296,000 MT in 2013.

Collectively the region purchased maize bran that it utilized and the opposite was true for oil seed cakes between 2009 - 2013.

Tanzania and Uganda have surplus bran while Kenya has the largest utilization capacity all of which combined puts the region at a deficit status. This is implicit of poor supply mechanisms between surplus and deficit regions.

The highest consumption of cake is in urban and peri-urban areas where feed processors are located as well as existence intensive livestock production.

Kenya as the largest deficit market for animal feed raw materials; especially oil seed cake and bran, has a growing intensive livestock production that has helped to catalyze local production of animal feeds in the country. The same in Uganda is driven by the dairy and poultry sector-contributing more than 50% of the total output from the livestock sub-sector.

In 2013, EAC produced 1.36 million MT of brans against utilization of 1.1 million MT. In the same year, there was a surplus of oil seed cake amounting to 209,000 MT.
Utilization and sufficiency of supply of Sunflower oil seed cake in the EAC

- Sunflower seed cake accounts for the largest proportion (about 45%) of the oil cakes used in the feed industry in EAC.

- There was a 118% increase in utilization of sunflower seed cake between 2013 and 2014 reaching 442,930MT. Otherwise between 2010-2013, the region produced more sunflower seed cake than was utilized at least going by formal records. Tanzania was the major contributor to this surplus that is usually exported to the region mainly Kenya & India.

- Tanzania and Uganda have a comparative advantage in production of sunflower seed cake. However, demand for sunflower seed cake is nearly the total of what is produced in Uganda and Kenya. Tanzania and Uganda could exploit the deficit market in Kenya that relies greatly on imports for cake supply and improve on quality & consistency in supply to tap further into the Asian market.

There was a 118% increase in utilization of sunflower seed cake between 2013 - 2014
As observed earlier, the poultry industry is driving demand for animal feeds industry in at least three of the countries that have the largest animal feeds industry in the region. Subsequently, poultry feed accounts for over 60-96% of the manufactured feed.

The high demand for poultry feed is driven by increasing demand for poultry products especially meat due to population increase that is becoming urbanized, and higher levels of disposable income. In the period 2010-2020, a 200% increase in poultry meat demand is expected in East Africa.

Between 60-96% of annual feed demanded in the region is in form of poultry feed.
With an exception of piggery, numbers of other types of livestock kept in the EAC was a positive trajectory between 2010 and 2014. Poultry is the most popular type of livestock kept in the region also recording the greatest rate of average growth rate of 5.4% between 2010 and 2014. Effective demand for livestock products in the region is also on an upward trajectory driven by increasing growth in population and urbanization at a rate of 35-40% in Tanzania and Kenya.

The highest demand for livestock products is for poultry at an average growth rate of 11%.

Going by these statistics, it would appear that growth in the animal feeds industry will be driven by growing demand for poultry and bovine meat production. However, such growth has been slow owing to limited production of maize the major ingredient in many animal feeds formula and competing uses of the same as food.

Projected increase in demand for animal feed will put pressure on the availability of raw materials. It follows then that to meet this demand, there needs to be a commensurate increase in production of raw materials such as maize, rice and oil seeds and their by-products.

Poultry production registered the highest average growth rate between 2010-2014 at 5.4%
Kenya has had a National Animal Feeds Policy in place since 2005, that aims at stimulating increased investment by the private and public sector to increase feeds production, ensure quality of animal feeds and reduce cost of production.

Also, the country has abundant energy - maize and rice bran as well as root crops - and proteins - soybean, sunflower cakes, cottonseed cakes sources that can be used as raw materials for feeds formulas.

However, slow implementation of the animal policy in Kenya and lack of the same in other EAC countries to provide a framework for regulation and certification of feed quality has led to a perpetuation of high priced but low quality commercial feeds. As a coping mechanism, there has been a proliferation of a cottage animal feeds industry especiary in Uganda and Tanzania in spite of glaring lack of knowledge about the process and animal requirements.

Kenya, Uganda and Tanzania import 5.5%, 4.4% and 0.1% respectively of their animal feeds raw materials demand; majorly seed oil cake and cereal bran. The former country majorly imports from the latter two perhaps due to limited demand for the raw materials owing to relatively smaller animal feeds industry in the two exporting countries. Kenya (and Rwanda) enjoys an import duty free regime on animal feeds raw materials meant to incentivize importation of the same.
Trade in Brans and Oil Seed Cakes in the EAC

7,900 MT and 766 MT annual imports of Maize bran and soya bean cake, 93% and 7% respectively of raw materials for animal feeds imported into the EAC between 2011-2015.

204,138 MT of bran, 70% of which was in form of wheat bran and 66,649 MT of oilseed cake mainly in form of sunflower seed cake was exported from the EAC annually between 2011 and 2015.
EAC countries, led by Tanzania predominantly import cereal bran (rice, maize and wheat) from the world markets. The region imported an average of 7,900MT of cereal bran compared to 766MT of oilseed cake between 2011 to 2015. However, the animal feed industry in Kenya, Uganda and Tanzania, is constrained by inter alia feed ingredient supply chain and procurement constraints as well as fragmented public and industry structure and legislation as regards raw material importation and quality standards. Kenya was the biggest inter-regional importer of raw material for animal feed taking up an average of 70% of the total imports in five years period coming to 2015.

Generally in 2013, Kenya was the biggest importer of oil cakes specifically soybean followed by Tanzania and Uganda (38% of total cake products in Uganda). Soybean oil cake is imported into EAC from Netherlands, United states of America, India, Malawi and Zambia. Other oil cakes though negligible imported into EAC were groundnut and cotton cakes. Maize bran is majorly imported by Kenya from India and United states of America.

As consumption of animal based products increases in the region, it will be expected that demand for animal feeds for an equally growing commercial livestock production will also increase. As such, substitution of imports of raw materials for the long run will be pegged on the ability of the region to increase...
production of the crops whose secondary products are used as raw materials in animal feeds production. Also, East African countries would have to exploit their comparative advantages in production of these crops, and facilitate trade of raw materials among them as well as put up mechanisms for regulation of the supply chain and quality of raw materials within and among countries.

More 90% of raw materials for animal feeds imported into the EAC is in form of maize bran.
Just like it imports, the region exports more bran mainly in form of wheat than it does oil seed cakes, exporting an average of 204,138MT in five year period to 2015. The brans were destined for United Arabs Emirates, India, Oman and Egypt. In comparison the region exported an average of 66,649MT of oilseed cakes 70% of which was from sunflower over the same period. In Uganda specifically, the relative low price of maize and low cost of transport put the country at an advantage over others. Tanzania at 93% followed by Uganda were the source of exports of sunflower seed cake consistent with their regional states as the lead producers of sunflower. Bran exports were lead by Tanzania followed by Kenya and Uganda respectively. The oil seed cakes were destined for India, United Arab Emirates, Pakistan and Italy.

The EAC as a block exported 22% more raw materials- cereal bran and oil seed cake- than it imports.

High demand for raw materials for feed in the Middle East is primarily due to expansion of poultry production as a result of increasing demand for poultry products. This is against the backdrop of suppressed domestic supplies of maize, most of which is used to produce feeds due to declining water supplies. Middle Eastern counties thus resort to other markets as a source of vital raw materials.

### Inter-regional Exports of Raw Materials for Animal Feeds in the EAC

<table>
<thead>
<tr>
<th>Year</th>
<th>Cake</th>
<th>Bran</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>78,112</td>
<td>71,064</td>
</tr>
<tr>
<td>2012</td>
<td>107,900</td>
<td>10,017</td>
</tr>
<tr>
<td>2013</td>
<td>97,943</td>
<td>4,033</td>
</tr>
<tr>
<td>2014</td>
<td>3,044</td>
<td>24,194</td>
</tr>
<tr>
<td>2015</td>
<td>171,164</td>
<td>230,117</td>
</tr>
</tbody>
</table>

Source: 19.
materials. On the other hand, the livestock industry in the EAC is highly sensitive to changes in price of raw materials to manufacture animal feeds. This scenario could perhaps explain flow of exports of animal feeds raw material from East Africa to lesser price elastic countries outside the region.

With these competing export markets, a rush for higher margins is likely to play out. As long as there will be a price incentive to export, there may be more raw materials such as maize brans leaving the region to the detriment of local animal feed industry. It is thus important to improve price competitiveness of raw materials produced in the region to incentivize increase intra-regional trade.

An average of 204,138MT of bran mainly from wheat and 66,649MT of oilseed cake, 70% of which was from sunflower was exported into the region between 2011 - 2015.
Cross-border Trade in Brans and Oil seed Cakes in the EAC

2013 data for Kenya and 2015 data for other EAC countries

Source: [19]
In 2013, Kenya was the biggest importer of raw materials for animal feeds from her EAC counterparts in 2013 sourcing 25,848 MT of maize and rice bran and 29,534 of oil seed cakes mainly sunflower and cotton. In fact, more than 70% of the cereal bran and oil seed cakes used in the feed manufacturing industry in Kenya is imported from Uganda and Tanzania. Uganda supplied 54% of maize bran while Tanzania supplied 98% of sunflower seed cake to Kenya. Uganda also exported 38% of her sunflower seed cake to Kenya in 2013.

In 2015, Uganda supplied the largest share of cereal bran to her regional counterparts at 14,210MT while Tanzania took the lead in oil seed cake mainly sunflower at 38,114MT. This trend could be explained by the fact that Tanzania is the lead producer of sunflower seed at around 350,000 MT annually. On the other hand, maize prices in Uganda are relatively low and the country exports a significant proportion of the maize she produces.

The sustainability of this is put to question given ongoing development of the livestock and feed manufacturing sector in the exporting countries, inconsistency and seasonality in supply, quality and composition of the raw materials in terms of nutritional value and contaminants. Implicitly, under the status quo, Kenya cannot continue to rely on Tanzania and Uganda for supply of these vital ingredients.

Availability, price and quality of animal feeds are triple drivers of intra-regional trade in animal feeds raw materials. To optimize this, there is need to improve productivity and quality of raw materials in the most cost effective ways.

Current productive capacity of maize and sunflower seed cake will collapse under the weight of collectively burgeoning animal feeds industry in the EAC. Thus, there is a need in paradigm shift for increasing supply of these vital raw materials.

Exports of bran and oilseed cakes from Tanzania & Uganda constitute 70% of raw materials used in feed manufacturing in Kenya.
### Seasonality of Supply of Raw Materials for Animal Feeds And its Effects on Prices

<table>
<thead>
<tr>
<th>Country</th>
<th>Product</th>
<th>Main destination</th>
<th>Production area</th>
<th>Period of purchase</th>
<th>Price range (USD/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kenya</strong></td>
<td>Rice bran</td>
<td>Nakuru</td>
<td>Migori</td>
<td>Oct-Mar</td>
<td>0.08-0.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kitale</td>
<td>Uganda</td>
<td>Apr</td>
<td>0.15-0.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Karatina</td>
<td>Uganda</td>
<td>Jan-May</td>
<td>0.12-0.17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kitale</td>
<td>Kakamega</td>
<td>Aug-Feb</td>
<td>0.15-0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Areas near Nairobi</td>
<td>Uasin Gishu</td>
<td>Jan-Nov</td>
<td>0.26-0.28</td>
</tr>
<tr>
<td></td>
<td>Sunflower cake</td>
<td>Kakamega</td>
<td>Uganda</td>
<td>Jan-Dec</td>
<td>0.17-0.20</td>
</tr>
<tr>
<td><strong>Tanzania</strong></td>
<td>Rice bran</td>
<td>Mbezi</td>
<td>Morogoro</td>
<td>June-Aug</td>
<td>0.07-0.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daressalaam</td>
<td>Morogoro</td>
<td>May</td>
<td>0.15-0.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mbeya</td>
<td>Songea</td>
<td>Dec-Aug</td>
<td>0.17-0.20</td>
</tr>
<tr>
<td></td>
<td>Maize bran</td>
<td>Mbeya</td>
<td>Mbozi</td>
<td>Jan-Nov</td>
<td>0.16-0.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dar-Es-Salaam</td>
<td>Kilimanjaro</td>
<td>Sept</td>
<td>0.17-0.21</td>
</tr>
<tr>
<td></td>
<td>Sunflower cake</td>
<td>Dar-Es-Salaam</td>
<td>Kilimanjaro</td>
<td>Jan-Nov</td>
<td>0.16-0.22</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sep</td>
<td>0.23-0.30</td>
</tr>
<tr>
<td><strong>Uganda</strong></td>
<td>Maize bran</td>
<td>Mbale</td>
<td>Mbale</td>
<td>Feb-Mar</td>
<td>0.12-0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jinja</td>
<td>Jinja</td>
<td>Jun-Dec</td>
<td>0.13-0.18</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lira</td>
<td>Lira</td>
<td>Jun-Mar</td>
<td>0.36-0.42</td>
</tr>
<tr>
<td></td>
<td>Sunflower cake</td>
<td>Gulu</td>
<td>Lira</td>
<td>Jun-Mar</td>
<td>0.23-0.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jinja</td>
<td>Lira</td>
<td>May-Feb</td>
<td>0.24-0.45</td>
</tr>
</tbody>
</table>

- Maize bran fetches the highest price -USD 0.36-0.42/kg- in the region between January and March in areas around Lira Uganda among the markets of study.

- On the other hand, sunflower cake coming from Lira Uganda and utilized in the Jinja was the most expensive at USD 0.24-0.45/kg among the areas investigated. This is peculiar because the Lira district is also a production hub of sunflower oil seed cake. This could be explained by high demand for the commodity in the area from especially Kenyan importers who set base there as was observed during this study.
Characteristics of Animal Feeds Processors in the EAC

44% and 45% of installed processing and storage capacity respectively is utilized by animal feeds processors in the EAC.
There is a correlation between commodity that is produced most in a country and use of its by-products for production of animal feeds in the three countries of analysis. For example, Uganda and Tanzania have a comparative advantage in production of sunflower thus use its cake more than in Kenya do. High cost of oil-seed cakes and other ingredients affected quality and quantity of production of animal feeds in Kenya.

Rampant small-scale nature of animal feeds manufacturers is implied in the local (within districts of location)sourcing of raw. However, large animal producers especially in Kenya import raw materials from Uganda and Tanzania.

Moreover, even East African countries like Rwanda which have historically had one of the lowest per capita consumption of animal products is embracing livestock production as a viable source of income for the rural poor a factor that is expected to ‘pull’ demand for animal feeds. Yet, cereals production in that country is not adequate for food much less for use in animal feeds production.

Increasing commercialization of the livestock sub-sector by countries such as Rwanda is expected to add to the already stressed capacity of the region to produce sufficient raw materials for manufacture of animal feeds. One way of changing this narrative would be to integrate cereal and oil seeds value chains on one hand and animal feeds value chain on the other for better off-take of by-products such as bran and oil seed caked by the latter.
Throughout the region, quality assurance of animal feeds raw materials and finished products is a concern of feeds processors and farmers due to high level of informality and poor coordination in the industry. A study conducted by Doha G, et al. found out that all feed sample of animal feeds collected throughout the EAC contain higher levels of aflatoxins than the EAC allowable 10ppb. Specifically for Uganda feeds have more than 15ppb aflatoxins. In addition, Kenyan feeds processors have to contend with unverifiable nutrient composition, presence or absence of substances that may be harmful to human and animal health. However, only 14% of maize in Tanzania was found to be having aflatoxins above the allowable EAC level compared to a regional average of 45% between 2010 and 2015.

The animal feeds sector all over the EAC lacks an aflatoxin standard mainly due to a weak industry self-regulation and an understanding among stakeholders that such standards will lock out small players. What is more, specified levels of aflatoxin and other mycotoxin contaminants are not mandatory quality requirements for imports into the EAC partner states.

In addition, feed quality assessment by the farmers and small scale manufacturers is mainly informal based on smell, colour, texture and assumed density of products that are associated with high protein and energy content.

While it is in no doubt that establishment and/or enforcement of standards for feeds and their ingredients will have economic and health benefits to both humans and animals, doing so should be done with care so that the standards are not too stringent to the extent of constituting extra cost burden to players. Besides, contaminated products that cannot go through the formal quality checks can still find their way to intended export destination through informal routes.

To this end, an alternative approach for regulation and enforcement of standards preferably by the private sector is needed for the informal trade in animal feeds raw materials to avert a potential barrier to trade among EAC.
Aflatoxins Levels in Animal Feeds: Case of Uganda

<table>
<thead>
<tr>
<th>Type of Feed</th>
<th>Average Aflatoxin Level (ppb)</th>
<th>Permissible Levels (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broiler Starter</td>
<td>40.5</td>
<td>20</td>
</tr>
<tr>
<td>Broiler Finisher</td>
<td>42.8</td>
<td></td>
</tr>
<tr>
<td>Layers Mash</td>
<td>67.5</td>
<td></td>
</tr>
<tr>
<td>Chick Mash</td>
<td>30.2</td>
<td>10</td>
</tr>
<tr>
<td>Growers Mash</td>
<td>38.6</td>
<td></td>
</tr>
<tr>
<td>Dairy mean</td>
<td>60.4</td>
<td></td>
</tr>
<tr>
<td>Sow and Weaner Meal</td>
<td>35.5</td>
<td></td>
</tr>
</tbody>
</table>

Source: 33, 34.

Using an example broiler and starter and chick mash, animal feeds found in the Ugandan market have more than half of the permissible levels of aflatoxins.

Poor quality of raw materials in Uganda is caused by post harvest handling at farm level and the same bran and cake by animal feeds manufacturers. The situation is so dire that Kenya, the main importer of raw materials for manufacture of animal feeds specifically sunflower seed cake has complained to Uganda authorities about the high levels of aflotoxin.
Utilization of processing and storage capacities by Animal Feeds Processors in the EAC

Barely half of processing and storage capacity installed by animal feeds producers is utilized. This is attributed to constraints of raw materials supply. Another culprit is limited demand for commercial feeds in East Africa with an exception of high potential areas in Kenya and Central Uganda caused by high prices of the feeds. Moreover high cost of commercial feeds dissuades livestock keepers from using them and once used it constitutes a high percentage of production costs.

In Kenya, Tanzania and Uganda, there exists a dual animal feeds industry whereby, on one hand there are a few large processors while on the other, there is proliferation of small scale processors with simple fabricated machinery and limited production costs.

Continued supply constraints of raw materials is likely to see the status quo in utilization of installed processing and storage capacity hold or even worsen against a backdrop of increasing demand for animal feeds. This calls for urgent interventions to increase production of raw materials by for example increasing value chain integration to increase coordination between raw materials producers, food (rice, maize and oil seeds) processors and animal feeds processors.
Prospects for Regional Trade in Maize bran and Sunflower Seed Cake in the EAC

64% and 33% of animal feeds manufacturers in Kenya and Uganda respectively willing to source for sunflower seed cake and maize bran regionally
Due to a expanding animal feeds industry in Kenya without corresponding increase in local supply of raw materials, 64% processors are looking to source for the raw materials outside their national borders. Animal feeds processors in Kenya especially suffer from low supply of oil-based ingredients due to weak domestic productive capacity of oil seeds.

Feed processors in Uganda are also willing to look for raw materials regionally. This could be because of an expanding livestock sector in the country but also poorly organized supply chain of sunflower seed cake from the production hub in parts of northern Uganda. However, the existing large-scale mills edible oils processors such as Mukwano Group produce large volumes of oilseed...
cake but there is no information readily available to indicate if the domestic livestock market could absorb additional volumes. Therefore the assumption is that the additional cake would have to be exported, thereby increasing the costs and introduces concerns as to competitiveness of the already low value cake (UGX 500/Kg) with the United Republic of Tanzania.

Those who are not interested in sourcing for animal feeds raw materials regionally are concerned about high costs and rigor of doing so. High cost of sunflower seed cake to animal feed processors is due to inter alia fragmentation of production and long distances between production hubs and where animal feeds manufacturers are located.

Tanzania and Uganda have comparative advantage in production of rice and maize bran and oil seeds while Kenya and Rwanda are largely a deficit countries. As such, it is important to leverage trade between these countries. Increased supply of raw materials will have a downward pressure on costs while suppliers will benefit from a bigger market.
Swot Analysis of the Animal Feeds Industry in the EAC
### SWOT Analysis of the animal feeds industry in the EAC

#### Strengths

1. Un-utilized processing capacity for possible expansion
2. Availability of sources of raw materials and market (livestock keepers who are their customers)
3. Low maintenance milling machines that result in low production costs of small-scale feed processors who are the majority.

#### Opportunities

1. Increasing demand for feeds both within a country and regionally due to growth in livestock production caused by commensurate increase in demand for animal products in the region
2. Implementation of the EAC-Common Market to facilitate regional trade in feeds raw materials and finished products
3. Entry of big players like maize millers into the animal feeds sector offers some hope for structuring of the industry
4. Fiscal rebates in some countries (Rwanda and Kenya) for importation of raw materials

#### Weaknesses

1. Manufacturers have limited technical skills to formulate and produce high quality compounded feeds
2. Highly cost of raw materials for animal feeds
3. Idle installed storage and processing capacity constitutes sunk costs for processors
4. Weak or absent industry associations to advocate for holistic improvement of the animal feeds and allied sub-sectors.
5. Limited availability of raw materials and inefficient procurement procedures
6. Poor technologies in producing raw materials especially cakes that limit their usability for manufacture of animal feeds
7. Poor quality (e.g. high aflatoxin and moisture content levels) of raw materials for animal feeds
8. High fixed transaction costs owing to limited scale in procurement of raw materials and sale of finished products coupled with information asymmetry.

#### Threats

1. Lack of /inadequate or poor implementation of regulatory framework of quality standards for feed ingredients has pushed out some processors who deal in genuine and high quality ingredients out of business and disincentivized new investments. Where a regulatory framework within a country exists eg in Kenya, there is no harmonization with other EAC which is a factor that constitutes a NTB.
2. Poor road infrastructure which increases costs of sourcing for raw materials
3. Limited if any support services: eg, extension, credit and technical information to raw material producers.
Challenges and Proposed Interventions for Improvement of Animal Feeds Industry in The EAC
Challenges and Proposed interventions to improve Animal feed Industry in EAC

1. Limited supply of raw materials for manufacture of animal feeds (quality and quantity)
   - Develop strategies for increasing production of raw materials. This may include, development of high yielding-early maturing varieties.
   - Leveraging structuring of the value chains to ease flow by linking producers of raw materials or primary oil processors with animal feeds processors especially for the former to consider animal feeds industry as a viable alternative market.
   - Create awareness and build capacity of producers and food processors in better management of maize, rice and sunflower seed raw by-products to preserve quality.
   - Remove any bottleneck and provide fiscal incentives for regional trade in raw materials for animal feeds.

2. Insufficient Regulatory and policy environment
   - Establish or strengthen in-country regulatory mechanisms to develop or enforce minimum quality standards for raw materials for animal feeds manufacture and final products.
   - Harmonize feed standards across the region to facilitate intra-regional trade
   - Research and development on production and handling of animal feeds to inform decisions and policy.
   - Train a crop of experts in feed formulation & manufacture and decentralize feed testing laboratories.

3. Limited Organization of the animal Feeds Industry
   - Introduce a set of fiscal incentives to attract big investors necessary to structure the animal feeds industry.
   - Promote creation of and/or build capacity of industry associations to offer a self-regulatory framework for quality assurance as well as advocate for better business environmental systems for Good Manufacturing Practices, quality control and auditing.
   - Develop a modus operandi for sampling of raw materials for animal feeds.
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Assumptions

Assumption A

Animal feed consumption was derived from daily feed requirements per animal and animal population. That is the daily feed requirement for dairy cattle (Kenya=2kg, Tanzania=1 Kg and Uganda 1Kg, with 1 kg the minimum daily dairy meal intake required to produce extra 2 litres on top of feeding cattle with roughages), For exotic poultry, it was Kenya,135g, Tanzania,117g and Uganda 120g).

Estimation of projected consumption figure of animal feeds in the EAC

- Projected consumption value were based on available data for upto 2014.
- Factors responsible for the previous trend were assumed to remain constant in future.
- Trend line projection was used to estimate the change in consumption of animal feeds for each country between 2014 and 2020.
Appendices
Appendix 1: Inventory of some selected Animal Feeds Processors in the EAC and their Supply Gap in animal Feeds Raw Material

<table>
<thead>
<tr>
<th>NAME OF BUSINESS</th>
<th>LOCATION</th>
<th>ACTUAL VOLUMES PROCURED (MT/YEAR)</th>
<th>REQUIRED VOLUMES (MT/YEAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sunflower Seed cake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosmos animal feed</td>
<td>Kitale</td>
<td>45</td>
<td>81</td>
</tr>
<tr>
<td>Mavuno agricultural enterprise</td>
<td>Kakamega</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td><strong>Rice bran</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosmos animal feed</td>
<td>Kitale</td>
<td>45</td>
<td>81</td>
</tr>
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<td>Sakina</td>
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<td>30</td>
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<td>16</td>
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<td>700</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Save Millers Limited</td>
<td>Kisumu</td>
<td>160</td>
<td>500</td>
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<tr>
<td>Lea Feeds (Mathira Millers)</td>
<td>Karatina</td>
<td>85</td>
<td>125</td>
</tr>
<tr>
<td>Salama Feeds</td>
<td>Karatina</td>
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<td>110</td>
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<td>Wonder Feeds</td>
<td>Nakuru</td>
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</table>
## Appendix 1: Inventory of some selected Animal Feeds Processors in the EAC and their Supply Gap in animal Feeds Raw Material

### Tanzania

<table>
<thead>
<tr>
<th>NAME OF BUSINESS</th>
<th>LOCATION</th>
<th>ACTUAL VOLUMES PROCURED (MT/YEAR)</th>
<th>REQUIRED VOLUMES (MT/YEAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sunflower Seed cake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Best Animal</td>
<td>Temeke</td>
<td>400</td>
<td>540</td>
</tr>
<tr>
<td>Ijumaa to Animal feed</td>
<td>Banana</td>
<td>48</td>
<td>83</td>
</tr>
<tr>
<td>Family quality mills</td>
<td>Tamania</td>
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<td>Simex</td>
<td>Mbeya</td>
<td>36</td>
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</tr>
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<td>City Animal Feed</td>
<td>Mbeya</td>
<td>28</td>
<td>36</td>
</tr>
<tr>
<td>Kwa tesha</td>
<td>Mbeya</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td><strong>Rice bran</strong></td>
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<td></td>
</tr>
<tr>
<td>The Best Animal</td>
<td></td>
<td>500</td>
<td>740</td>
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<td>Jm animal feeds</td>
<td>Mbezi</td>
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<td>750</td>
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<td>Family quality mills</td>
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<td>45</td>
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<td>Simex</td>
<td>Mbeya</td>
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<tr>
<td>City Animal Feed</td>
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<td><strong>Maize bran</strong></td>
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<td>The Best Animal</td>
<td>Temeke</td>
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<td>520</td>
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<td>Banana</td>
<td>48</td>
<td>83</td>
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<tr>
<td>Family quality mills</td>
<td>Tamania</td>
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<td>City Animal Feed</td>
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<tr>
<td>Simex</td>
<td>Mbeya</td>
<td>18</td>
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<tr>
<td>Kwa tesha</td>
<td>Mbeya</td>
<td>7</td>
<td>9</td>
</tr>
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</table>
## Appendix 1: Inventory of Manufacturers of Animal Feeds

### Uganda

<table>
<thead>
<tr>
<th>NAME OF BUSINESS</th>
<th>LOCATION</th>
<th>ACTUAL VOLUMES PROCURED (MT/YEAR)</th>
<th>REQUIRED VOLUMES (MT/YEAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunflower Seed Cake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuvita Feeds</td>
<td>Jinja</td>
<td>4,100</td>
<td>6,000</td>
</tr>
<tr>
<td>Aluchick Feeds</td>
<td>Lira</td>
<td>1,250</td>
<td>7,200</td>
</tr>
<tr>
<td>Ocii Chicken And Animal Feeds</td>
<td>Gulu</td>
<td>400</td>
<td>1,000</td>
</tr>
<tr>
<td>Maize Bran</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aluchick Feeds</td>
<td>Lira</td>
<td>1,250</td>
<td>7,200</td>
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<td>Gold Feeds Farm Enterprises</td>
<td>Mbale</td>
<td>400</td>
<td>650</td>
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<td>Gulu</td>
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<td>1,000</td>
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<td>Jinja</td>
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<tr>
<td>Biyinzika Poultry International Limited,</td>
<td>Gulu</td>
<td>1</td>
<td>20</td>
</tr>
</tbody>
</table>

### Rwanda

| Maize bran                       | Kicukiro | 72,000                             | 75,000                      |
COUNTRY OFFICES

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Plot 42, Princess Anne Drive, Bugolobi
P.O.Box 71782, Kampala - Uganda
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