



Kingdom of the Netherlands

AGRI-MACHINERY SCAN

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Executive Summary

Objectives and Target Audience of this report

The objective of this study was to explore the gaps as well as the trends in the demand and supply for agri-machinery in Uganda to identify trade opportunities that posed suitable entry points for Dutch traders. The targeted audience of this report is the Dutch trader, and the report places emphasis on opportunities from which the Dutch trader could have competitive advantages.

The report discusses and explores (i) the economic overview and the overall business climate prevailing in Uganda, followed by an explanation of the protocols to follow in starting a business in Uganda. Key drivers and trends influencing agrimachinery adoption are discussed, including an analysis of demand for local versus imported machinery. The report later covers the financing available for agri-machinery investments, and also analyses the key actors participating in or influencing adoption of agrimachinery. Finally a list of potential trade opportunities is analyzed and recommended.

Uganda is a fast growing economy in Africa.

The Ugandan economy is vibrant, fast growing, and attractive for investment. The country demonstrates strong fundamentals including high and sustained GDP growth, on the one hand, declining poverty levels on the other, and inflation held steady within the single digit range. The country has been politically stable for decades with a mature political party system of democratic governance. Infrastructure, especially that conducive for business, remains underdeveloped, although there is clear and strong commitment to address these bottlenecks. Uganda stands poised to further tap into regional market opportunities across the free trade area and common market blocks in which it participates, unlocking growth into a market of some 400 million consumers. The role Agri-machinery needs to play in unlocking this potential will be instrumental.

Tapping into regional markets requires value addition to manufacture competitive products. A Significant volume of Uganda's regional exports are still informal cross border sales with limited value addition. However the experience of the Dairy sector whose regional exports are on the increase on account of increasing local processing capacity, illustrates the potential of mechanization and value addition to unlocking regional market demand.

Business Environment in Uganda is conducive for business:

Uganda has worked hard to address the constraints towards doing business in Uganda, and besides presently investing heavily on strengthening the roads and electricity infrastructure, has paid special focus on improving the environment in which business can be started, or formalized. By setting up a one stop centre at the Uganda Investment Authority (UIA), potential businesses, foreign and local can now be facilitated with all their registration requirements from a single location.

The process of starting a business is initiated by business name registration with the Uganda Registration Services Bureau, followed by an application for a tax identification number, after which an application for a trading license can be lodged, before trade activities can commence. The UIA one stop centre is able to support in all these activities.

Where traders are not looking to set up formalized companies as an entry strategy, there are local companies with the potential and willingness to partner in distributorship or agency relationships. Embassies can play an important role in brokering these linkages

The tariff structure is conducive for agri-machinery imports, attracting 0% import duty and withholding taxes, an incentive aimed at increasing the mechanization and value addition of agribusiness. However VAT of 18% is payable on all agri-machinery imports.

An enabling policy environment exists, conducive for investment and trade in agri-machinery

The Government has put in place a conducive policy and strategy frameworks aimed at transforming Uganda into a prosperous middle income country by 2030. Within the overarching strategy, espoused in the “2040 Vision” the Agricultural strategy specifically aims to transform the agricultural sector from subsistence farming into sustainable commercial agriculture, so as to make agriculture profitable, competitive and sustainable, while the aim of Industrialization strategy is to bring about an Industrial sector that is modern competitive and dynamic, and fully integrated into the domestic, regional and global economies. Initiatives that promote access to mechanization and processing technologies align with advance the national agenda.

The Informal sector is a dominant factor in agribusiness

Primary production level is dominated by small holder and subsistence farmers, who produce most of the country's food but rely 90% on hand powered tools to do so, and only to a limited extent on mechanized equipment. Such farmers are vulnerable to poverty and are often unable to commercially access productivity enhancing equipment. The processing sector on the other hand is dominated by the micro SME's which accounts for up to 80% of food manufacturing companies. These businesses operate on an annual turnover of less than UGX 10 million per annum.

The informal sector is a present reality that must be well considered in any analysis of trade for agri-machinery, both in terms of the constraints posed towards adoption of conventional machinery, as well as the opportunities possible with innovative and appropriate technology

Trends influencing increased Agri-machinery commercialization.

There are a number of key trends that are influencing agri-machinery demand. Notable among these is increasing transformation of small holder farmers from subsistence into commercially oriented, profit focused farmers – appreciative of and enabled to access productivity enhancing inputs, and machinery; also observed is the more prominent role of organized farmer groups and cooperatives in linking small farmers to productive and high value assets such as through the collective ownership for instance of tractors, and milk cooling and processing equipment..

Additional trends include the increasing participation of the mid- income population into agribusiness activities, and consequently the increased demand for high quality and productivity enhancing technology, such as greenhouses, for which the Dutch trader could have competitive advantage. Also large scale commercial farming is on the rise, driven by foreign, local and joint venture businesses.

Particularly noteworthy is the increasing penetration of tractor hire services, which are being recognized as not only more efficient, but cheaper than the alternatives of manual or animal powered systems. This presents strong possibilities for the trading of not only new but also quality 2nd hand tractors

It is also becoming more difficult to access cheap labour, particularly as free “Universal education” has absorbed the youth into schools. It is equally a point of concern, the high youth unemployment levels as high as 65% that create potential for social and political upheaval.

Perhaps most important, the level of financing targeted at Agriculture is on the increase, driven by increased capacity and confidence by financial institutions in managing the risks posed by agricultural financing.

Access to finance:

The financial sector of Uganda is fairly well developed with the participation of 25 banks and at least 130 micro finance institutions. The banking sector in particular remains the dominant and most important source of financing for Agricultural and Industrial sectors. While bank coverage has increased, with more Individuals and businesses able to access formal financial services, most bank lending is still extended to the non-traded goods sectors, with the traded sectors, such as agriculture and manufacturing receiving only 25% of total bank credit. Banks contribute up to 95% of total amounts lent to agriculture, although the agricultural sector which accounts for 24% of economic activity, still attracts only 10% of total bank lending.

Specific bank products targeted at agri-machinery financing include Lease financing and the Agricultural Credit Facility-set up by the government in partnership with commercial banks targeted specifically at investments in the agribusiness sector. Analysis of bank lending indicates that the percentage of lease financing is on the rise, accounting for as high as 9% of total lending from a situation of about 2% in 2012.

Other available sources of financing for agri-machinery include the Microfinance Support Centre (MSC) loan facility as well as Microfinance Institutional asset lending - particularly important as it targets that hard to reach, underserved, yet dominant Micro SME clientele.

Demand for local vs. Imported Machinery

Local Machinery: There is a robust demand for locally fabricated machinery in Uganda, due a number of key factors including (i) appropriateness of technology- designed to suit local needs (ii) Durability- especially as compared to imports from China, (iii) Convenience- easy to tailor to fit into clients specific circumstances and (iv) proximity, given that local fabricators could be more easily accessible compared to importers normally based in a few Urban centres. While local fabrication caters to both needs at primary production and processing levels, the most in-demand locally fabricated machinery are at the processing level and in particular for the grain milling, animal feeds and bakery sectors.

However, the capability of the local fabrication industry is limited to the manufacture of “simple” machines which are easy to reverse engineer. More complex machinery such as dairy processing equipment is often beyond the capacity of local manufacturers. In addition, low efficiency and performance is a major weakness associated with locally fabricated machines with quite often, poor design, due to lack in-depth expertise, leading supply of equipment that is not energy efficient, and highly prone to breakdowns.

Imported Machinery: The major importers of machinery are Chinese and Asian based importing firms, the leaders among these including (i) Asia Agro Industries, (ii) Auto Sokoni Limited, and (iii) China Huangpai Food Machines- all of whom import a wide range of agri-machinery items. Consequently the major agri-machinery imports into Uganda originate from China and India respectively. Other important countries of origin for include Arab Emirates, Denmark, USA, and the Netherlands.

The leading import categories relating to agri-machinery include (i) tractors, (ii) grain processing machinery, (iii) packaging machinery, (iv) Dairy processing machinery (v) Machinery for primary production of crops and (vi) Poultry farming equipment.

Key Actors supporting the Agri-machinery space include

Key stakeholders that influence the direction of innovation, production transfer, and marketing of agri-machinery include:

The Uganda Industrial Research Institute (UIRI)- responsible for among others technology development for manufacturing and processing activities, and which welcomes partners wishing to synergize to improve the agrimachinery and industrial landscape of the country;

Agricultural Engineering and Appropriate Technology Research Centre (AEATREC) responsible for generating and promoting agricultural technologies that improve productivity value addition, income and food security. Innovations are farmer focused looking at the primary production and post-harvest levels

Other stakeholders include: Ministry of Trade Industry and Cooperatives- who approve trade licenses for foreign nationals; Ministry of Agriculture Animal Industry and Fisheries; Uganda Investment Authority- who facilitate business registration processes at the one stop centre and the Uganda National Bureau of Standards- enforcers of quality standards in Uganda.

Summary of Trade Opportunities identified

The agri-machinery trade opportunities identified that provide competitive advantages to a Dutch trader are highlighted in the table below. Details of these trade opportunities can be found in chapter 3.

		Agri Machinery Opportunity	Rating
1	Dairy	Processing machinery of Mini Dairies	High
2	Dairy	Milk Cooling tanks and centres (MCC's)	High
3	Land Cultivation	Tractors	High
4	Poultry	Battery Cage	High
5	Poultry	Hatcheries	Medium
6	Dairy	Dairy-Dispensing Machines	Medium
7	Dairy	Dairy-Milking Machinery	Medium
8	Horticulture	Greenhouse for Vegetable	Medium

Abbreviations and Acronyms

CICS	Competitiveness and Investment Climate Strategy
DDA	Dairy Development Authority
DSIP	Development Strategy and Investment Plan
EAC	East African Community
EKN	Embassy of the Kingdom of the Netherlands in Uganda
MAAIF	Ministry of Agricultural Animal Industry and Fisheries
MSME's	Micro Small and Medium Enterprises
MTIC	Ministry of Trade, Industry and Cooperatives
NAADS	National Agricultural Advisory Services
NUTIP	Netherlands Uganda Trade and Investment Platform
PIBID	Presidential Initiative on Banana Industrial Development
UCCCU	Uganda Crane Creameries Cooperative Union
UIA	Uganda Investment Authority
UNDATA	Uganda National Dairy Traders Association
UNHS	Uganda National Household Survey
USSIA	Uganda Small Scale Industries Association
VAT	Value Added Tax
VC	Value Chain
VCA	Value Chain Analysis
VCF	Value Chain Financing
WB	World Bank
WHT	Withholding Tax

1 Introduction

“Uganda is Africa condensed, with the best of everything the continent has to offer packed into one small but stunning destination” (UIA)

Uganda Vision 2040: Uganda aspires to transform from a peasant country to a modern and prosperous upper middle income country with a per capita income of \$9,500, (Vision 2040)

1.1 Background

1.1.1 Objective of this study:

This study was commissioned by the Embassy of the Kingdom of the Netherlands in Uganda (EKN) in March 2015, with the aim of exploring the demand and supply trends for agri-machinery in Uganda, with a view to identifying and analyzing potential entry points for Dutch traders. This study both supports and responds to the growing need to accelerate the modernization of agriculture and agribusiness practices in Uganda through increasing mechanization.

Agricultural machinery from the Netherlands has demand from both farmers and agro-processing companies in Uganda; accordingly, EKN aims to identify the feasible trade opportunities for Dutch traders of agri-machinery to Uganda through the Netherlands Uganda Trade and Investment Platform (NUTIP). However, EKN and potential traders have limited knowledge about the demand and supply trends as well as landscape of the local agri-machinery industry. It is precisely this knowledge gap that this study aims to bridge.

1.1.2 Criteria in Identification and Analysis

The target audience for this report is the Dutch business person with commercial interests in Uganda. As such, this report places emphasis on analysis that explores areas of competitive advantage for a Dutch trader. In particular, the following criteria are used in the analysis and recommendation of opportunities:

- (i) Trade potential: This scan identifies trade opportunities with the potential to generate significant revenue either by a sizeable deal or by a large volume of activity.
- (ii) Relevance for the Dutch trader: The study analyzes opportunities that align with Dutch trader expertise
- (iii) Potential for growth: Opportunities are also identified where the potential for growth is significant.
- (iv) Competitive advantage: The study pays particular attention to areas where quality and efficiency can provide a competitive advantage.
- (v) Barriers to entry: Areas in which the level of complexity makes local replication difficult are particularly attractive trade opportunities for traders.

1.1.3 Methodology

The study executed by SMJR Company Ltd, over a three month period (April-June 2015) was carried out in three key steps, through: (i) extensive field research including the identification of and field visits to both suppliers and users of agri-machinery (ii) in-depth and extensive key informant interviews including; regulators, financiers, importers, fabricators, and facilitators of agri-machinery trade activities and (iii) desk research of existing literature on mechanization and agri-machinery in Uganda.

This study, aligns fully with the provided terms of reference, and aims to inform the Dutch trader with adequate insight into the (a) demand attributes for agri-machinery across a number of sectors, and (b) the factors affecting competitiveness and suitability for participation in the agri-machinery sectors.

This study begins with a country overview, which highlights the importance of the agricultural sector and explores the business environment and enabling drivers supporting trade activities in Uganda. The report also informs about the protocols necessary in starting up an import based trading business in Uganda. Following this, the report then explores the dynamics between local and imported machinery, from which a summary and analysis of strategic agrimachinery opportunities is provided.. Later sections discuss the key actors participating in or influencing agri-machinery adoption, and the options available to finance agrimachinery purchases in Uganda.

1.2 The Uganda Investment Climate

1.2.1 Overview of the Economy

Uganda is a landlocked country covering an area of 242,000 km², with a population of 35¹ million citizens. A nation positioned astride the equator, Uganda enjoys favourable climatic conditions and abundant rainfall that places her in the unique and competitive position of having two annual growing seasons making agriculture the backbone of the economy. The contribution of agriculture towards GDP has steadily declined, only contributing 23.2% in 2013. This reversal is driven by the faster growth of the services sector (44.7% of GDP and the Industry sector 26.6% of GDP). Agriculture nevertheless remains the major source of employment with about 66% (UBOS 2014) of the country's working population earning a livelihood from agricultural activities. Additionally an analysis of manufacturing activity indicates that up to 65% of the country's manufacturing activity is derived from the processing of (i) food (41%) drinks and tobacco (18.5%) and textiles, clothing and footwear (5%).

The fundamentals of Uganda's economy are quite strong, moving from recovery to growth over the past 3 decades. Over the past 20 years, the level of GDP growth has averaged between 6.8%-8%, with inflation mostly in the single digit range. The country's economic revival and success is largely attributed to the Governments broadly liberal economic policy approach that has promoted a free market economy, the privatization of public corporations and the aggressive promotion of private sector growth.

The country has outperformed in one of the key MDG goals in relation to poverty reduction, and was one of the first Sub-Saharan countries to halve poverty levels before the 2015 deadline. The national population living on less than a dollar a day now stands at 19.7%,² a remarkable drop from the 56% recorded in 1992-93 reflecting the growing size of the Ugandan population integrated into the market economy. Uganda however remains a relatively poor country, with a per capita GDP of \$657 (vs Kenya at \$1,245 and Nigeria at \$3,005). (World Bank 2015)

Uganda is politically stable, and has enjoyed relative peace in Uganda for the past 30 years. Government institutions- particularly the legislative and Judiciary arms-have been increasingly strengthened, and exhibit increasing levels of autonomy and independence. While the same political party- the National Resistance Movement- has held political power since 1986, there have nevertheless been regular and peaceful elections that have increased national confidence in the level of democratic maturity of Uganda. Corruption in government remains an endemic and deeply rooted challenge.

¹ As at the recently concluded 2014 population census.

² 2012-2013 UNBS Household survey

Youth unemployment is increasingly emerging as a defining challenge of the times, standing at about 65%, with an annual influx of 400,000 youth job seekers in a labour market that offers about 9,000 jobs annually³. This undesirable and unsustainable situation, poses risks of social and political upheaval, and for which productive and rewarding youth employment opportunities must be created. Increasing agribusiness opportunities through facilitating the trade and access to quality agri-machinery, among others, could be a low hanging solution to this challenge.

Addressing key infrastructural bottlenecks such as low electricity coverage and an underdeveloped tarmac road network are among the nation's key priorities, whose importance is well reflected in their share of the nation's budget allocations. Electricity coverage extends to only about 14%⁴ of the population, while tarmac covers only 15% or about 3,000 kilometers of the national road network. These are clearly significant bottlenecks that constrain Uganda's competitiveness as a business trade and investment destination.

Oil wealth, recently discovered however holds out promise, that the modest economic gains will be accelerated when drilling, harvesting and export commences, somewhere in the next 3-5 years. The government is committed in its resolve to prioritize oil revenues towards strengthening infrastructure- including roads, electricity, and irrigation- that is conducive to and supportive of agricultural and industrial development.

The nation's security is paramount, particularly in the new era of increased terrorism threats. Significant annual allocations of national budget towards security and national defense have bolstered not only the country's security but that of the region, with Uganda playing an active role in the peacekeeping effort in fellow Eastern African nations.

Uganda has been described as the pearl of Africa⁵, and indeed holds strong untapped potential to be the food basket for the East African Region. The value of informal cross border trade with neighbours is already estimated at about \$450 million. And yet this barely touches the potential of Uganda as a member of the COMESA⁶ and EAC regional trade areas, a market of some 400 million consumers. With her abundant rainfall, fertile soils, accessible, and affordable labour, as well as increased access to value adding agri-machinery Uganda can be a competitive feeder of the region.

Ugandans share a bold aspiration to transform their nation from a peasant into a modern and prosperous and middle income country by 2040. Access to quality agri-machinery will play a vital role in this vision.

1.2.2 Doing Business in Uganda

The World Bank 2015 doing business survey ranked Uganda 150th out of 189 countries for ease of doing business. This reflects a decline of several places from 2012 position of 123rd. Uganda scores poorly in the categories of (i) starting a business (ii) getting electricity and (iii) access to credit, but performs better in the category of resolving insolvency.

It is in great part to resolve these well-known constraints to competitiveness, that the government has facilitated the creation of a "one stop centre" that offers a comprehensive range of services that would be required by an investor or trader in the process of registration and licensing of their businesses. The Uganda Investment Authority (UIA) which is responsible for issuing of investment licenses, has been transformed into a one stop centre, and now houses representatives of the following core agencies (i)

³ Cited from the Ministry of Gender Labour and Social Development

⁴ <http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS/countries/UG-ZF-XM?display=graph>

⁵ By Royal Geographical Society Explorer Henry Morton Stanley, and Sir Winston Churchill

⁶ These are discussed in detail

Uganda Registration Services Bureau- who provide company registration; (ii) Uganda Revenue Authority- who deal with taxation issues; (iii) National Environmental Management Authority- that ensures environmental compliance. The Integration of all these regulators under one roof has significantly shortened and made less laborious and more straightforward the process of formalizing business and trade investments in Uganda.

1.2.3 Getting Started –trading in Uganda

To start up a business of importation and trade in Agri-machinery, one would have to follow through with the following steps:

Registration: A foreign company will require 3 certified copies of Memorandum and Articles (MEMARTS), accompanied with dully filled in Business Registration forms 19, 20, 21 and 22. These forms are available locally at Uganda Bookshop. Once ready with this documentation as well a payment of \$470 paid in favour of URA, these forms can be delivered to the Uganda Registration Services Bureau (URSB) located at the one stop centre in UIA, and business will be locally registered as a foreign company. **A locally incorporated company** is required to present its MEMARTS accompanied with the Business Registration Form 7 to the URBS for registration.

Acquiring Tax Identification Number: Once the business has been registered, then the next step is for an application to the Uganda Revenue Authority for a Tax Identification Number. This can now be successfully concluded at the UIA one stop centre.

Acquiring trading license: Once registered for tax, all traders must register for a trading license prior to commencing trade within the Central Business District. Since 2014, this is now a 2 step process. Aspiring traders will (a) acquire a “certificate of approval” from MTIC⁷. This application process may take up to 2 days; (ii) Purchasing trading certificate from licensing authority- who in the case of Kampala is the Kampala City Council Authority (KCCA).

Besides, starting a business to conduct trade, an agri-machinery supplier could also consider alternative market entry options including the following:

Local Distributorships: Many exporters rely upon local distributors and agents to act as their feet on the ground. There are several local companies with the potential and willingness to enter into distributorship or agency relationships. Information on such companies can be sourced from several sources including embassies, the UIA or the Uganda Manufacturers Association (UMA) among others. Several agri-machinery companies are presently engaged in trade with Uganda under this arrangement.

Joint Ventures: Similarly, there are many local manufacturing and processing companies looking for joint ventures with foreign suppliers⁸. Such joint ventures from an agri-machinery supply perspective can be valuable in a number of ways: (a) it allows foreign firms to take advantage of the local and regional expertise to supply machinery while also sharing some of the risks with the local partners (b) lower costs of production can be achieved through only the import of specialized parts that are not locally available, with the manufacture and assembly being done locally.

⁷ Since January 2014, the Ministry of trade, Industry and Cooperatives (MTIC) issued new guidelines to the effect that a “certificate of approval” was to be issued to all non-citizens who wish to conduct trading only in Uganda. This certificate is issued by the Ministry. The guidelines require that all trade licensing authorities are directed to demand for the above certificate for all non-citizens applying for a trade license. This process takes about 48 hours

⁸ An example of this would be Tonnet Agro-Engineering Company Ltd, a leading local manufacturer of agri-machinery who is actively seeking Joint Ventures with manufacturers of specialized parts needed in the making of more complex machinery such as destoners.

1.2.4 Tariff Structures

As part of the government's strategy to support increased mechanization and value addition capacity, all items of agri-machinery, even when imported for trade purposes will not be subjected to import duty or Withholding tax (WHT). However since the 2014-15 financial years, VAT on agrimachinery became payable.

Table 1: Applicable taxation on Import of Agri-Machinery into Uganda

Tax	Rate	Comment
Import Duty	0%	Exempt
Withholding Tax	0%	Exempt
VAT	18%	Payable

1.2.5 Enabling Policy Environment:

To unlock Uganda's potential, The Government of Uganda (GoU) has put in place a number of strategies and policies to improve the trade and investment climate address known challenges to doing business in Uganda and improve Uganda's regional and global competitiveness.

The overarching framework informing national policy is provided by the Vision 2040: the nation's 30 year strategic roadmap; as well as 10 year and 5 year National Development Plans (NDP's). In these plans; the critical roles that industrialization and agriculture will play in the nation's economic transformation are clearly amplified. Out of these strategic frameworks, clear and comprehensive guidelines and strategic activities have been detailed in the relevant short term sector strategies and policy frameworks⁹.

The Agricultural sector strategy aims to transform the agricultural sector from subsistence farming into sustainable commercial agriculture, so as to make agriculture profitable, competitive and sustainable, and is supported by the following frameworks; the (i) Development Strategy and Investment Plan (DSIP) 2010-2015, and (ii) the National Agricultural Policy.

Similarly, *the Industrial and Manufacturing sector*, guided by the National Industrial Policy (2008) and the National Industrial Sector Strategic Plan (NISSP) 2010-2015, aims to bring about an Industrial sector that is modern competitive and dynamic, and fully integrated into the domestic, regional and global economies. The critical roles of mechanization and value addition towards increasing Uganda's productivity and competitiveness are well amplified.

Various additional sectoral approaches supportive of agricultural and industrial development are outlined in the National Trade Policy, National Export Strategy, and the Competitiveness and Investment climate strategy (CICS)- whose goal is to contribute to the enhancement of productivity, competitiveness and incomes by identifying constraints to private sector growth in Uganda.

⁹ including the National Industrial Sector Strategic Plan of 2010, and the Agricultural Sector Development Strategy and Investment Plan (DSIP); as well as various policy guidelines including the National Agricultural Policy 2013- that details the prevailing approach to transform Ugandan agriculture from subsistence farming into sustainable commercial agriculture, among others

2 Demand Analysis

Do opportunities for the importation and trade of quality agri-machinery equipment exist in Uganda? There are a number of key factors and trends that influence demand in the Ugandan context. The most important of these are detailed below:

2.1 Agri-Machinery Demand Drivers

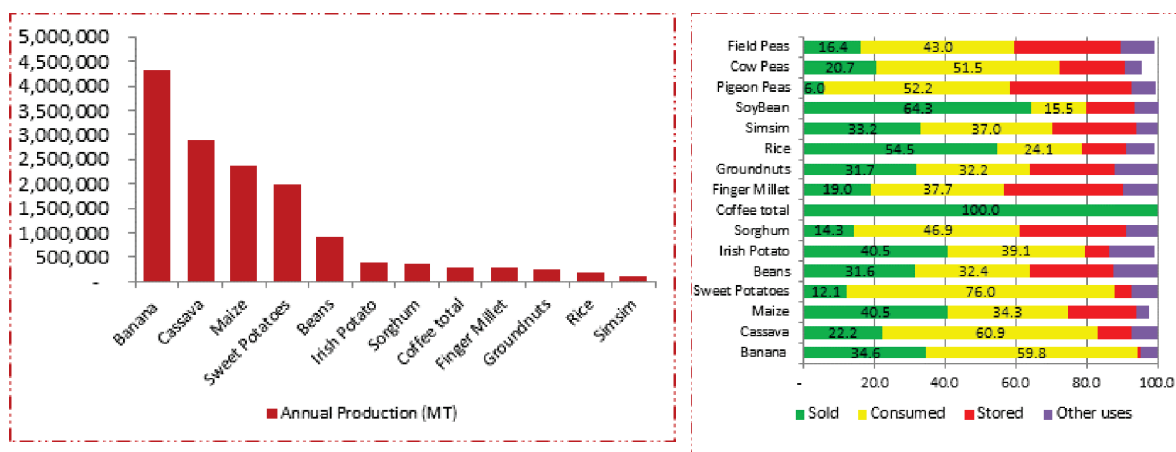
2.1.1 Commercialization propensity of commodity,

A necessary first step in the identification of agri-machinery opportunities with potential and strategic suitability for Dutch traders is an analysis of existing value chains from the perspective of:

- (i) Volume of production- as higher volumes necessitate the adoption of agri-machinery to catalyse increased productivity, and
- (ii) Level of value chain commercialisation- the extent to which a commodity is produced for sale rather than as a food crop. There is a strong causal relationship between disposition levels on the one hand, and adoption of agri-machinery within value chains on the other; specifically, the more commercialized a commodity is, the higher the capacity for agri-machinery adoption¹⁰.
- (iii) Government prioritisation- the commodities identified as areas of focus and the main recipients of government investments. 15 commodities were identified including: Exports (coffee, tea, cotton), Cereals (Maize and rice), Fish, beans, Tubers (cassava, Irish Potato), Livestock (Dairy, Beef, Goats Poultry, Fruits (citrus, Pineapples, Apples), and Banana

The analysis below highlights the relative importance of the key value chains in Uganda, and their degree of commercialization.

Figure 1: Major Value Chains in Uganda and their level of disposition



¹⁰ Key exceptions exist, such as in Banana, where though up to 40% of banana is sold, the sale is predominantly of fresh unprocessed commodity, and the level of agro processing in Uganda is limited to a state funded initiative under the Presidential Initiative on Banana Industrial Development (PIBID), solar drying of dessert banana, and a banana juice company.

It is the most highly productive value chains that are equally highly commercialized that present the biggest potential for agri-machinery demand. Factoring all the above parameters, the following commodities present the highest opportunities for agri-machinery absorption, and are analyzed in detail in chapter 3.

Category	Commodity	Rating	Rationale
Cereals	Rice & Maize	High	Rice: <ul style="list-style-type: none"> ➤ Highly commercialized, and all rice is fully subjected to value addition through rice hulling and polishing processes ➤ Uganda is a net importer of rice implying additional opportunity for commodity growth of local supply Maize <ul style="list-style-type: none"> ➤ Most highly produced cereal, with high level of commercialization ➤ High level of processing for both food and animal feeds.
Livestock	Dairy, Poultry	High	Dairy <ul style="list-style-type: none"> ➤ High level of growth driven by both public and private sector investments in growing the dairy herd ➤ Limited level of processing (only 10%) relative to volume of milk marketed ➤ Emerging export opportunities- demanding additional processing to be leveraged. Poultry <ul style="list-style-type: none"> ➤ High growth of the sector driven by changing tastes preferences, and increasing affordability of poultry. ➤ Steady and sustained growth in export markets
	Beef	Low	Beef <ul style="list-style-type: none"> ➤ Nature of value chain does not open up to meaningful trade opportunities. Opportunities are more in investments such as Abattoirs and Fattening Units
Tubers	Cassava & Irish	Low	Cassava <ul style="list-style-type: none"> ➤ Low levels of commercialization as cassava is mostly food crop ➤ Some value addition relating to milling of cassava flour is currently done, but targeted at tiny market that cannot at present sustain imported machinery. Irish Potato <ul style="list-style-type: none"> ➤ Highly commercialized but sold unprocessed mostly to eateries and fast food restaurants and households. ➤ One company recently set up will process Irish potato into products for local and regional markets. ➤ Sighted trade opportunities lie in commercial peeling equipment, for eateries.
	Fish	Low	Fish <ul style="list-style-type: none"> ➤ Fish has limited trade opportunities. Processing facilities of fish is targeted at export markets. This calls for investment rather than trade opportunities.
	Banana	Low	Banana <ul style="list-style-type: none"> ➤ The most highly produced (by volume), banana is mostly sold fresh. ➤ The significant investment into banana value addition has been the state sponsored Presidential Initiative on Banana Industrial Development, a large scale investment. ➤ Drying of "apple banana" targeting export markets, addresses a small market opportunity that is adequately served by locally made sun drying equipment.

2.1.2 Informal and small actor (MSME) sector dominance

The informal sector is a key component of Uganda's economy, estimated at 49%¹¹ of Gross Domestic Product (GDP). The informal sector is deeply embedded at all levels of the agricultural value chains, from primary production, value addition, to the retail and customer engagement level. The implications of this economic structure on the potential for trade in imported agri-machinery are material.

2.1.2.1 Primary Production

Primary production in Uganda is dominated by smallholder and subsistence farmers operating on an average of two acres. Up to 90% of the country's food production, is grown by households, who produce first to meet their own needs, before any excess is then passed on for sale to the market. For such producers, farming activities, typically involving (a) land opening, (b) ploughing (c) planting (d) weeding and (e) harvesting- are powered by manual hand tools. It is commonly suggested that up to 90% of farm activity in Uganda is powered in this way, with animal traction supporting only 8% of farm activity, and mechanized equipment accounting for a marginal 2% of farm power¹².

This tends to trap small holder farmers into a vicious cycle, as because of their limited productivity, income and profitability of farm activities is constrained, which in turn keeps the farmer unable to afford productivity enhancing farm technology. But there are emerging trends shifting the landscape of the Ugandan farmer, and unlocking demand for agri-machinery.

Increasing commercially oriented small scale farmers: Successful public and private initiatives in building knowledge and skills in improved farming practices- the so called farming as a business- is causing a significant transformation in farming practices among small holder farmers. With increased knowledge and skills of how to improve farm productivity, there is an increasing uptake of high productivity inputs such as hybrid seeds, and increasing sales of imports of farm level machinery such as walking tractors- and increased demand of locally fabricated diesel powered threshers. These are important signals suggesting a growing capacity by small holders to adopt improved farm technology. In addition, as farmers' incomes increase as a result of improved inputs and technology (such as animal traction), so too will their appetite and capacity for even more improved technology¹³.

Organized farmer groups, creating small holder access to agrimachinery opportunities: The practice of forming farmers into groups as village groups, or regional and national cooperative associations, bears significant importance for increasing access to improved technology. By acting collectively, under formal, legally organized structures, farmers are able to (i) consolidate their own resources as well as (ii) access external financing that facilitates the acquisition of high value assets, such as tractors, milk cooling equipment, or storage silos. One of the most notable recent initiatives through which area cooperatives have facilitated small farmer members in accessing high value machinery from the Netherlands is the acquisition of 100 milk cooling units by 100 dairy area cooperatives under the Uganda Crane Creameries Corporative Union (UCCCU) in south-western Uganda. Similarly, small groups of organized small farmers in the Northern parts of the country are able to attract the services of large tractor hire operators as a consequence of the considerable areas of farm land to be worked. The implication of this trend is that effective ways have been unlocked and applied to bridge resource constrained farmers with productivity enhancing, but otherwise inaccessible agri-machinery technologies.

¹¹ Referenced from the 2015-16 Budget speech by Minister of Finance.

¹² Among the several areas this is cited is in the Agricultural Sector Development Strategy and Investment Plan (DSIP) 2010-2015.

¹³ A cross section of farmers using walking tractors, were using improved hybrid seed, and had previously been working with owned or hired animal (oxen) powered farm systems.

Mid-income population increasingly taking to agribusiness: This emergence of what we refer to as the “corporate farmer” will increasingly boost demand for agri-machinery. There is an increasing interest among the Ugandan middle-income population to tap into the potential of agriculture. From discussions with these Individuals motivations are different, ranging from (a) the desire to diversify their income streams, (b) experiencing a new passion to (c) connecting back to roots and heritage¹⁴, and (d) as a plan toward self-employment and wealth creation. Unique to this “corporate” farmer is the broader access to knowledge¹⁵ of modern trends in agribusiness, and the desire and ability to invest in technologies that maximize productivity and efficiency.

This type of farmer constitutes a small but growing minority, but is very important, on account of the fact that they are most likely to demand the type of machinery that maximizes quality, efficiency- for which Dutch traders can have a key competitive advantage. Accordingly, this type of farmer is more likely to afford agri-machinery, or at least be in a position to access financing for it.

Growth of commercial farms: The positioning of the commercial farms within the primary production segment is small but notable. According to the 2006-07 census¹⁶ of businesses, there were 400 commercial farms employing 28,000 employees. A decade later, the exact population of farms is not known, but is expected to be significantly higher, as there have been several documented large scale start-ups, either locally owned, foreign owned as well as joint ventures¹⁷. The primary and most immediate agri-machinery requirements for all such farms are Tractors and tractor implements. Other needs, according to farmers interviewed include Irrigation equipment to reduce dependence on rain-fed agriculture. There is evidence, especially among established estates to import their machinery requirements directly, but for many emerging farms, that are locally owned, acquisition will be through locally existing machinery dealerships¹⁸. Considering the high cost of brand new tractors, it is likely that high quality 2nd hand tractors from a reputable seller can create a strong competitive advantage in the market.

Increasing availability of quality and affordable and more accessible local technology: Locally developed and manufactured machinery is addressing the needs of farmers both in functionality- as local innovations tend to align more directly with end users specific needs, as in affordability and convenience- given increasing access to local fabricators. This is making local technology innovations increasingly important in meeting on-farm technology requirements of Ugandan farmers.

Increasing difficulty in accessing cheap labour: The availability of abundant “cheap” labour is cited as one of Uganda’s advantages. In fact availability of quality but affordable labour is becoming more difficult to access. While several reasons account for this, the most notable could be due to the reduced availability of family labour, as government sponsored education programs have absorbed children into schools. Availability of hired labour is also indicated as having become less easily available. It is becoming viable under these circumstances for farmers to consider options of mechanization.

¹⁴ Even among the well to do Urban employed, there is a strong affinity to agriculture, as many are 1st or 2nd generation, that have broken out of the subsistence farming cycle.

¹⁵ Such farmers are now frequently profiled in the national press in initiatives (partly funded by the EKN) to grow knowledge, and inspire action. Such farmers also through the recent best farmer competition were able to travel to the Netherlands on a working visit to develop and increase knowledge of more efficient ways of farming.

¹⁶ Uganda Bureau of Statistics, Census of Businesses, 2006-07

¹⁷ Some of the more recently established large scale farms include (i) Northern Uganda Agricultural Centre (NUAC), and (ii) Simba Farms- both grain producing farms in Northern Uganda and (iii) Gulu Country Dairy Farm- a well mechanized Dairy farm that is involved in Fodder production, or (iv) Eastern Rice Company- a rice processing firm, integrating backwards into the large scale production of rice. The above examples aim to provide a flavor of the growing interest and investments in capital intensive farm production systems.

¹⁸ The Ugandan farmer is less interested in or benefits less from importing directly, and enduring lengthy wait periods. He is more likely to invest in readily available machinery.

Increasing competitiveness of tractor hire services: it is becoming increasingly clear that use of tractor hire services where available is more competitive, as costs are similar. These combination of factors, are driving conversion towards mechanized farming.

2.1.2.2 Processing:

At the level of processing, the small actor continues to play a dominant role. There are about 6,000 businesses involved in food manufacturing, 80% of which earn an annual turnover of less than 10 million shillings (\$3,300). In addition most of the businesses (91%) are run as sole proprietorships, with only 5% operated as private limited companies. This is the reality of the Uganda manufacturing space.

The bulk of businesses in Uganda participate in grain milling activities (2, 639) and Manufacture of bakery products (2,317). Collectively these two manufacturing sectors account for 83% of total food manufacturing businesses.

Figure 2: SME's involved in Food Manufacturing

Manufacturing activity	Number of Businesses				Total
	<5 million	5 - 10 million	>=10 million	Not Stated	
Food Manufacturing	3492	1300	1070	104	5966
Processing of Meat & Fish	32	80	50	7	169
Manufacture of Bakery	1,960	190	150	17	2,317
Manufacture of Other Food	40	30	90	12	172
Manufacture of Grain	1,260	850	520	9	2,639
Coffee & Tea Processing	10	50	140	12	212
Manufacture of Animal Feeds	-	20	30	21	71
Manufacture of Beer & Spirits	180	70	70	13	333
Manufacture of Soft Drinks & Mineral Water	10	10	20	13	53

Source: Census of Business Establishments (COBE 2010-11)

The dominant role of the MSME in manufacturing is a present reality that must be well considered in any analysis of trade for agri-machinery, both in terms of the constraints posed towards adoption of conventional machinery, as well as the opportunities possible with innovative and appropriate technology.

2.1.3 Tapping into regional market opportunities

Local and Regional Markets are creating significant but as yet marginally tapped opportunities: The establishment by EAC member states in 2009 of a common market for East Africa¹⁹, opened the wider East African Community market to Ugandan businesses and products. Beyond this market, the states within the Common Market for East and Southern Africa (COMESA), in which Uganda participates, have worked towards the establishment of a Free Trade Area (FTA), reducing and eliminating import tariffs for member nations, while establishing a common external tariff (CET) structure for imports from third countries. Uganda as a COMESA member has the opportunity to participate in a market across 14 member states, of 400 million consumers, and an estimated collective internal trade worth a substantial \$15 billion²⁰.

¹⁹ In 2009, EAC member states signed the Common Market Protocols, in which duty tariffs relating to exports between countries within the EACU would be phased out gradually over a 5 year period. Working towards a common market has been implemented since 2010.

²⁰ <http://programmes.comesa.int/>

The country is however only marginally tapping into these opportunities. Informal cross border sales still account for a significant portion of Uganda's exports. In 2012, cross border sales amounted to \$450 million, accounting for up to 16% of total exports. Of this, agricultural exports- consisting majorly of maize grain, beans, fish, cattle, and groundnuts- amounted to \$185million. Unlocking the potential Uganda has as a regional food basket calls for increased investment in value addition equipment, to deliver higher value products that can compete favourably in the regional export markets. Citing the example of the Dairy sector, as a direct consequence of increased processing capacity of milk into longer lasting products, and powdered milk, dairy related exports increased from about 8.8 billion shillings (\$3.4 million) in 2011 to 30 billion shillings (\$11.5 million) in 2012, and is targeted to achieve \$50 million in 2015²¹.

2.2 Demand for Local Versus Imported Machinery

2.2.1 Local Manufactured Machinery

There is a robust demand for locally fabricated machinery in Uganda. Locally fabricated machinery is in many cases more competitive than imported equipment that serves the same purpose. The key drivers, that create this demand include: (i) Appropriateness of technology, as local fabricators have over time redesigned to suit the local needs; (ii) Durability: there is a widely held perception that locally fabricated machines are designed to be more durable (and indeed on a visual inspection of locally fabricated grain and feed mill machines these appear to be of materials with a thicker gauge than similar purpose machines imported specifically from China and India; (iii) Convenience: It is possible for a fabricator to tailor and develop machinery suited to the specific needs and payment terms²² of the client; and (iv) Proximity as fabricators are more widely spread and more localized in communities than the major importers who tend to be urban based²³

2.2.1.1 Machinery Demanded

There are 2 categories of machinery locally manufactured being (i) farm power equipment—tools and equipment used in primary production and post-harvest handling and (ii) processing equipment- used by SME's adding value to agricultural produce .

The most in-demand locally fabricated machinery is that produced for the grain milling and animal feeds sectors²⁴. Next to this, local fabricators satisfy the demand for bakery machinery (ovens, dough mixers) and coffee processing machinery (hullers). This finding closely aligns with the COBE mapping of businesses summary highlighted above.

2.2.1.2 Constraints to Local Manufacture

Interesting to note, is that the prices of locally manufactured machines are not necessarily cheaper than imports, even against those from China and India. The table below illustrates the pricing between a leading local manufacturer and a well-established importer.

²¹ <http://www.monitor.co.ug/Business/Prosper/Demand-for-Uganda-s-dairy-products-grows/-/688616/2603208/-/14vpymgz/-/index.html>.

²² Some clients pay on a piece meal basis, and fabricators are able to halt and restart the development process as and when payments are made.

²³ There are 134 metal fabricators registered under the Uganda Small Scale Industries Association (USSIA).

²⁴ Based on interviews with Fabricators

Table 2: Price analysis imports vs. local fabrication (selected machinery)

	Local (UGX)	Imported (UGX)
Maize Mill	15,000,000	6,500,000
Maize Huller	9,000,000	5,800,000
Rice Huller	18,000,000	15,700,000

However, the capability of the local fabrication industry is limited to the manufacture of “simple” machines which are easy to reverse engineer. More complex machinery such as dairy processing equipment (e.g. continuous flow pasteurizers and homogenizers), is often beyond the capacity of local manufacturers²⁵

In addition, there is limited ability by local fabricators to manufacture stainless steel based products. This gap is created by a combination of factors including (i) a lack of skill (ii) a lack of equipment and (iii) the high cost of stainless steel. This is a gap that will remain filled by imports.

Low efficiency and performance is a major weakness cited by users. Despite the fact that locally fabricated machinery could be more robust, easier and cheaper to build, and therefore most of the time more affordable, quite often, poor design, due to lack of in-depth expertise and capability by local manufacturers, makes machines very inefficient, resulting in high operational costs and downtime.

2.2.1.3 Appropriate Technology initiative

To support and nurture local capacity to develop relevant agri-machinery suited for Uganda's specific needs, the government created and mandated The Agricultural Engineering and Appropriate Technology Research Centre (AEATREC²⁶) and the Uganda Industrial Research Institute (UIRI) with the development of innovative, and appropriate technology equipment that address the needs of small scale farmers and agro-processors. AEATREC in particular is mandated to develop agri-machinery that improves productivity on the farm (at the primary and post-harvest handling level). A comprehensive summary of the on-farm technologies that AETREC has developed is provided below:

Table 3: Appropriate technology innovations for primary production by AEATREC

1	Ox Ploughs
2	Ox driven Planter
3	Ox driven weeder
4	Ox driven Harrowers
5	Moldboard ploughs for walking tractors
6	Planters for walking tractors
7	Weeders for walking tractors
8	Hand planters
9	Ridgers (for Irish potato mounds)
10	Lowland Rice Planters
11	Lowland Rice weeders
12	Groundnut strippers

Unfortunately, despite several effective machinery innovations that could improve on-farm performance, adoption of AEATREC's technology remains very low, largely because of technology transfer weaknesses. The local fabrication industry- the conduit between innovators such as AEATREC and end

²⁵ There is limited capability to provide imitation but not actually make the product

²⁶ AEATREC and UIRI are discussed further under key stakeholders.

users, responds to and manufactures in direct response to actual prevailing consumer demand, and while AEATREC's technologies are designed to meet existing needs, these needs by farmers are not translating into effective demand.

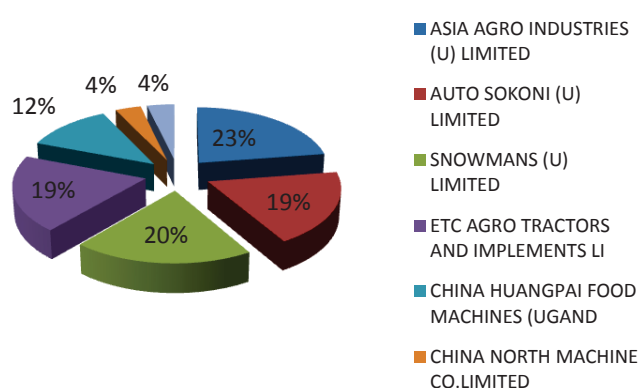
2.2.2 Imported Machinery

This is a key feature of the agro machinery landscape. One of the key drivers of imported machinery is quality. Imported equipment is thought to be of superior quality than the local machines and is preferred where quality and efficiency are key parameters²⁷. Similarly, the limited ability for local fabrication where there are shortcomings in the capacity to locally produce agri-machinery is also a major factor in the importation of agri-machinery.

Figure 3: Leading Agri-Machinery Importers

2.2.2.1 Major importers

The key importers of agro machinery into Uganda include (i) Asia Agro Industries (ii) Auto-sokoni (iii) Snowmans (iv) ETC Agro (v) China Huangpai Food Machines (vi) China North Machine. The chart illustrates the indicative rankings of these importers based on value of imports.



2.2.2.2 Major Imports

An analysis of key imports over the past 2 years is instructive in assessing trends of agri-machinery imports. The key imported items by value include tractors, grain processing and dairy equipment. The import statistics as well as an interpretation of the key numbers is provided as follows:

Table 4: Agri-Machinery imports by Value 2013 & 2014 (shillings)

	2013 Value of imports	2014 Value of imports
Tractors & implements	24,442,432,969	27,398,743,791
Grain Processing	18,756,402,503	16,851,789,930
Packaging Machinery	13,810,115,149	21,792,750,237
Dairy Processing	12,465,194,597	5,326,781,175
Primary Crop Agriculture	6,837,511,574	12,304,735,737
Crop- Harvest/post-harvest	1,257,145,632	723,514,607
Poultry	801,637,037	1,835,792,838
Animal feeds (fodder)	706,372,969	179,667,420
Combine Harvesters	223,543,486	142,600,856
Animal feeds	180,442,621	836,286,511
Dairy Processing-milking	64,538,824	33,490,926

Source: Import statistics

²⁷ This perception does not hold firmly where Chinese and Some Indian machinery is concerned. Severally, there were clear misgivings about the quality of China machinery.

Notes:

Tractors:

Import statistics of tractor machinery indicate that up to 395 and 440 tractors were imported into Uganda in 2013, and 2014 respectively. The average price of a new tractor purchased from among the major tractor retailers in Uganda²⁸ ranges from **about 81 million shillings (\$27,000²⁹), to 145 million shillings (\$48,490³⁰)**. This is affordable by very few Individuals and commercial farms, and creates a gap that could be filled by high quality 2nd hand imports.

Grain Processing

Whereas 18 billion Uganda shillings represents a significant and second most important agri-machinery imports category, it should be observed that, the bulk of this value (>80%), relates to direct imports by established companies, rather than sales through trading import company's. This highlights the important observation, that most well established companies will tend to procure and import their agri-machinery needs directly, rather than leverage locally established importers.

Packaging Machinery

Analysis of packaging machinery imports highlights a heavily disaggregated base of importers, and equally diverse packaging machinery types, ranging from TETRA PAK machines imported by Dairy processors, to packaging equipment for Meat processing; as well as packaging for grain processing, and beauty products among others. A diversity of actors, could suggest the possibilities of meaningful trade opportunities.

Dairy Machinery

In 2013, 95% of Dairy imports related to new establishments (9 billion shillings), and upgrades in existing Dairy plants (2.5 billion shillings). There is limited participation of traders with the main import trader of Dairy machinery- Snowmans Ltd- accounting for only 1% of imports. This could be attributed to the high cost of dairy processing equipment that bars wider trader participation, and could signal opportunities for better positioned importers- for instance who supply lower cost better quality equipment.

2.2.2.3 Country of Origin for Imports

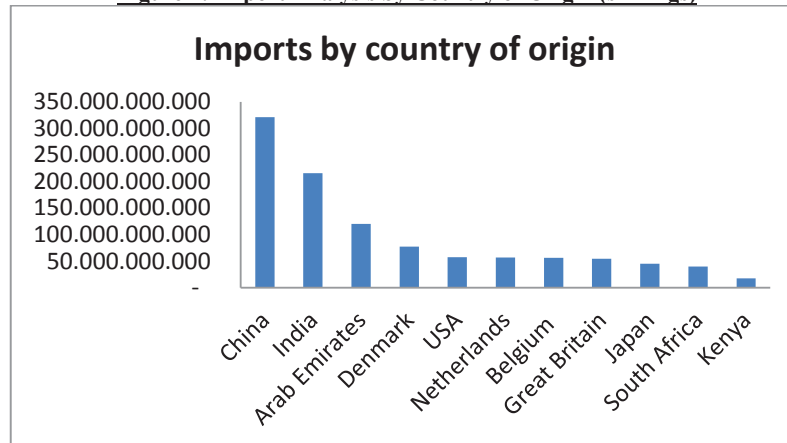
China and India occupy a dominant role, in the supply of agri-machinery into Uganda. This is explained by their ability to provide goods that fit within the affordable price range of many Ugandans. Achieving this however seems to have a detrimental effect upon the quality of goods supplied severally described by those interviewed as "less durable" and "less resilient". However, a different point of view indicates that those willing to pay for quality can still find and import it from China. Nevertheless, China and India, more closely meet the price points that customers are able to pay, often being cheaper than local manufacturers. The figure below summarizes the key countries of origin for imported agro processing machinery over the past year (2014).

²⁸ Leading Tractor retailers in Uganda include (i) Engineering Solutions -Massey Ferguson tractors, (ii) Cooper Motors -New Holland tractors, TAATA

²⁹ Based on a quotation of a TT 75 4WD New Holland Tractor from CMC.

³⁰ Based on a quotation of a Massey Ferguson MF290Xtra-2WD Tractor.

Figure 4: Import Analysis by Country of Origin (shillings)



3 Agri-Machinery Opportunities Identified

3.1 Summary Analysis of Identified Agri-Machinery Opportunities

Based on the preceding demand scan, a summary and rating of potential agri-machinery trade opportunities is highlighted below assessed against the criteria that give the Dutch trader competitive advantage. Consequently, the highly and medium rated opportunities are analyzed in more detail in the proceeding chapter:

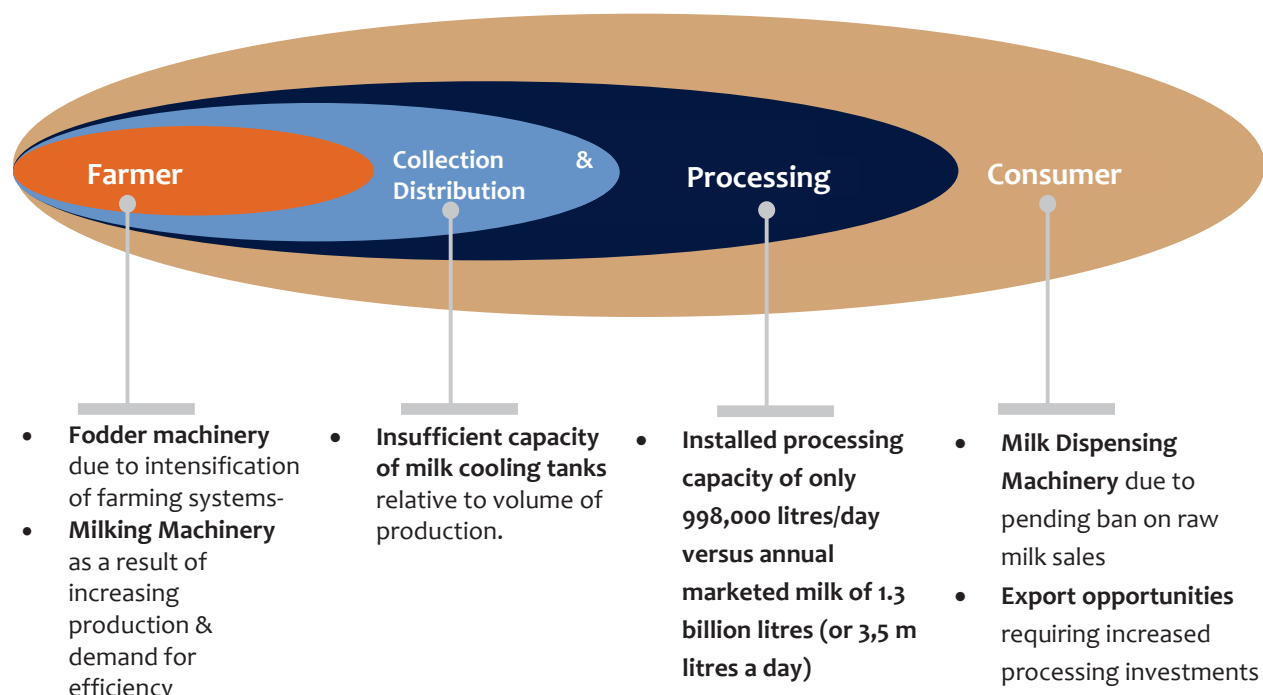
	Agri Machinery Opportunity	Rating	Rationale
1	Dairy-Processing machinery	High	<ol style="list-style-type: none"> 1) Limited milk processing relative to volume of milk traded, implies significant growth opportunities in processing capacity 2) Growing export potential can only be accessed with processed milk products 3) Potential ban on raw milk vending will unlock significant demand for processing
2	Dairy-Cooling tanks	High	<ol style="list-style-type: none"> 1) Fast growing supply nationally is not addressed by the available Milk cooling tank infrastructure 2) Organised farmer groups are increasingly acquiring the capacity to acquire high valued assets on commercial basis. (rather than grants) 3) Milk transporters provide a ready market for quality cooling equipment
3	Tractors	High	<ol style="list-style-type: none"> 1) Tractor is recognised as both more efficient and cheaper than other forms of farm power. This is catalysing small holder demand for tractor hire services 2) Growing importance of commercial farming. 3) Organised farmers group structures support the collective acquisition and ownership of high value assets such as tractors
4	Battery Cage	High	<ol style="list-style-type: none"> 1) Potential exists, and is growing. Current supply is characterised by excessive profiteering by traders at expense of customers- an opportunity for a lower cost provider 2) Cages address critical constraints faced by today's farmer including limited space, feed optimization and thefts of stocks. 3) The major downside to this opportunity is the adverse perceptions held by EU countries, which might make opportunity "unstrategic".
5	Hatcheries	Medium	<ol style="list-style-type: none"> 4) Fast growing demand of the poultry sector in response to local and regional demand 5) Opportunities for small hatcheries to service clients "out of the way" of the major hatcheries 6) High level of investment to integrate parent stock as well as Biosecurity concerns, increase risks associated with this investment, reducing demand
6	Dairy-Dispensing Machines	Medium	<ol style="list-style-type: none"> 1) This technology taps into Dutch expertise 2) This technology is bound to become increasingly relevant, if long awaited government bans on raw milk vending are finally effected.
7	Dairy-Milking Machinery	Medium	<ol style="list-style-type: none"> 1) Accelerated growth of dairy herds increasingly managed under Intensive and semi intensive systems. 2) Reducing availability of cheap labour making efficient technology a welcome option 3) Organised farmer groups and cooperatives are facilitating linkages between small farmers and credit, knowledge and technology (such as milking equipment).
8	Greenhouse for Vegetable	Medium	<ol style="list-style-type: none"> 1) Attractive to middle class aspiring farmers who have the financial resources or easier access to credit 2) Farming under greenhouse can be highly lucrative practice- this is increasingly understood, and appreciated 3) The increasing difficulty for Uganda's horticulture exports to conform to EU

			standards under open air farming, raises incentive to farm under green house
9	Grain Milling & Processing	Low	1) Sector is dominated by Micro SME actors who have limited capacity to afford quality imported machinery 2) Local supply of agri-machinery for this category is well developed 3) Imports from China and India addressing this category are well established
10	Bakery Manufacture	Low	1) Sector is dominated by Micro SME actors who have limited capacity to afford quality imported machinery 2) Wheat the major ingredient in the Bakery process is predominantly imported, and to this extent baking business does not catalyse local agricultural value chain developments. 3) Local supply of agri-machinery for this category is fairly well developed
11	Coffee processing	Low	1) While coffee processing contributes significantly as a cash crop and major export earner, processing opportunities are limited majorly to the wet and dry milling processes to convert coffee berries into an export grade coffee beans. Local fabrication industry of the small scale processing mills is competitive 2) Existing processors operate under capacity 3)
12	Oil Seed processing	Low	1) While Oil Seed contributes significantly to Agricultural GDP, investment opportunities are limited because the sector is dominated by a few key players, one of whom has invested massively in the primary producers (offer of inputs on credit) , thereby locking farmers into his supply chain 2) Industry operates with high excess capacity. 3) Investments are high at about \$100k for a 7 ton per hour production capacity. That is likely difficult for most potential customers. 4) Simple small capacity oil presses are available from local fabricators.

3.2 Analysis of Prioritized Agri-Machinery Opportunities

This section describes the selected agri-machinery opportunities in detail, particularly exploring the strengths that make these trade opportunities viable, as well as potential risks associated with them.

Figure 5: Overview of machinery opportunities in Dairy Sector



3.2.1.1 Background:

The Dairy sector in Uganda has varying levels of agri-machinery adoption at the following stages: (a) fodder management (b) milking machinery (c) cooling and distribution (d) processing and packaging and at (e) the dispensing at retail stage. Presently the level of machinery in use relative to the quantity of milk production is significantly low. The key agri-machinery import opportunities in Dairy are analyzed as follows.

3.2.2 DAIRY- MILK DISPENSERS (MILK ATM'S)

Strengths/Opportunities

Demand and production of dairy products: The Dairy sector is estimated to be growing at an average rate of 8-10% per annum³¹, yet it is still not fully meeting existing and growing demand. Per capita consumption in Uganda is estimated at 50 litres, a mere ¼ of the World Health Organization (WHO) recommendation of 200 litres, and still far below the consumption of neighbouring Kenya at 100 litres.

³¹ Dairy Development Authority

While there are no specific statistics on dairy milk demand, these analyses underscore the potential yet to be unlocked in the sector. The vibrant growth of the sector presents opportunities for innovation.

Impending ban on raw milk vending: There have been efforts since 2007 by the government to enforce a ban on raw milk sales due to the perceived dangers consumers face from the unprocessed milk trade. With such a ban in place, milk dispensing machines will become an essential technology at the point of retail, as there will still exist, a demand for lower priced milk- lower price points that can be achieved through the sale of pasteurized but unpackaged milk- as served by dispensing machinery.

Existing potential market; existing raw milk retailers, who have invested heavily and have a deep knowledge of the sector, are prime candidates to adopt this technology, as a viable response to a ban on the sales of raw milk. Many of these actors have invested heavily in backward integration, setting up their own distribution trucking systems and milk collection centres. They are more likely to invest ahead rather than exit the trade should a raw milk ban be effected.

Schools opportunities: Milk dispensing equipment is well suited to school settings, and is an attractive opportunity as a technology that ensures hygiene and health standards can be assured within a sensitive setting such as a school. This opportunity is also being considered by some of public³² and private investors interviewed

Proof of Concept: There is already one functional milk dispenser in Uganda, operated in one of the busy towns in the capital city Kampala. Operational for about 6 months at the time of this study, the self-service dispenser accepts coinage of 500 (\$0.16) or 1000 (\$0.33) shillings in exchange for a serving of pasteurized milk. In discussions with the operators of this 400 litre capacity setup, it appears that there is a steady and growing clientele, although this could be attributed to strategic location close to a University and therefore in proximity to a young, impressionable and aspirational customer segment. Innovative in Uganda, a key question is whether this technology can revolutionize the way milk is retailed and accessed by the larger segment of milk consumers, especially as regulators become increasingly critical of raw milk vendors. From the experience of the “Moo Milky Bar” as the above described business is called, the outlook appears quite positive.

Weaknesses/Threats

Failure to ban raw milk trade: Increased feasibility of milk dispensing machinery is heavily tied to the successful ban on the sale of raw milk in urban centres. Then it becomes worthwhile and possibly a matter also of business survival for raw milk retailers.

Embedded raw milk consumption behaviour: The sale of pasteurized unpackaged milk will always be uncompetitive in a market that accepts and trades raw milk. The sale of unpacked but pasteurized milk has been tried before with little success. Traditional consumption behavior has a lot to do with this. The culture of drinking milk by the glass in Uganda is not very common. Milk bought by household consumers is mostly purchased for the making of tea with milk known locally as “African tea”. Most raw milk purchased will therefore undergo some kind of boiling (home level pasteurization) before it is consumed. For this reason mainly, consumers do not perceive the rationale for spending more on unpackaged pasteurized milk. Consequently, without the extreme effect of a raw milk ban, milk dispensing machinery may prove viable only in limited settings such as up-market neighbourhood and points of sale (such as shopping malls and supermarkets)

³² The potential for investing in simple milk dispensing units in schools was highlighted in discussion with SNV Dairy team members as an interesting initiative to be pursued for future Dairy programs. UCCCU also expressed that Dispensers could form an integral part of their CSR initiative in which free milk is given to schools in South-Western Uganda.

3.2.3 DAIRY- MILK PASTEURIZATION MACHINERY (MINI DAIRIES)



Strengths/Opportunities

The opportunity for milk pasteurization machinery is assessed as highly attractive. This is for the following key reasons.

Untapped export potential for Dairy: Formalizing the dairy sector through increased processing capacity and adoption of modern technology would be critical if Uganda were to increase its regional and international market opportunities. Uganda's Dairy exports increased from 8.8 billion shillings to 30 billion between 2012 and 2013³³, driven by both cross border and international sales. Neighbouring Kenya accounts for close to ¾ of exports, and other neighbouring countries like South Sudan, Rwanda and Tanzania, are becoming fast growing markets for dairy products from Uganda. Processed long life milk and powdered milk are the key dairy exports. The potential of the export market can therefore not be overstated; making the role that increased investments in agri-machinery will play to unlock this potential critical.

Existing installed processing capacity is still insufficient, more so during peak production in the rainy seasons. During this time, all the major dairy plants are unable to process raw milk supplied from the countryside dairy farms. This surplus milk is absorbed by the informal market, underlying the importance of this channel to the dairy sector. It is estimated that total processing capacity installed in Uganda is about 998,000 litres, of which 55% (550,000 litres) is owned by Brookside Dairies³⁴.

Impending ban on raw milk vending: As already highlighted above, there have been efforts since 2007 by the government to enforce a ban on raw milk sales due to the perceived dangers consumers face from the unprocessed milk trade. The key advocates for the raw milk ban have cited dangers such as adulteration, unethical and harmful preservation techniques among the key dangers placing consumers at risk. However since 2007, efforts to enforce a ban on raw milk sales have been futile³⁵. One of the more recent actions by raw milk stakeholders is a recent petition before the President of the country in mid-2014 where raw milk traders made some important arguments regarding the country's, ability to harness all milk for processing, not least of which is the fact that installed processing capacity of the Dairy Sector of 998,000 litres a day is sufficient to absorb up to only 30% of all marketed milk

³³ <http://www.monitor.co.ug/Business/Prosper/Demand-for-Uganda-s-dairy-products-grows/-/688616/2603208/-/14vpymgz/-/index.html>.

³⁴ Brookside Dairies from Kenya recently acquired this company from Sameer Agriculture and Livestock Limited (SALL)

³⁵ Based on Discussions with Raw Milk traders, and Newspaper articles citing the ongoing

Consequently there is increasingly a lingering and underlying sense that the successful execution of the raw milk ban is simply a matter of time³⁶. The proposed raw milk ban is planned initially for only the central business district, and while the raw milk consumption statistics of the CBD are not readily available, such a ban would have a dramatic increase on the volume of pasteurized milk, and strain the existing capacity to produce it.

Existing capacity of raw milk transporters to upgrade to mini dairies: Raw milk traders and transporters have invested heavily to meet the cold chain infrastructure requirements set by the Dairy regulatory body³⁷. This equipment includes cooling tanks installed in countryside milk collection centres (MCC's) close to the farmers, as well as in urban retail outlets. In so doing, these stakeholders have consolidated their commitment to the sector. An exit from this sector as a reaction to a ban on raw milk is unlikely due to this high level of investment, much of it debt financed³⁸. Instead, the leading actors are keen to explore investments in mini dairy processing capabilities. In fact there are a number of examples of raw milk traders that have upgraded to milk processors, the most notable being *Mama Omulungi*, and the most recent being *Trust Dairies*.

Trust Dairies in particular have been able to set up a Dairy processing plant by assembling different elements of machinery from various suppliers. For instance, a (used) cooling tank was purchased from Germany, a (used) Pasteurizer from China while the (used) Homogenizer and (used) Packing machine were procured from India. In most cases to date, investments into dairy processing have involved expensive turnkey projects, involving the set-up of a brand new complete processing unit. The experience of Trust Dairies and others demonstrates that there is also a potential market for used but quality machinery in the milk processing sector.

Weaknesses/Threats

Quality: Reliance on used equipment exposes traders to risks of poor quality, defective machinery. Extra costs could be incurred to apply repairs and fixes.

Lacking skill and expertise in processing. Many potential and interested purchasers- such as existing raw milk transporters, express hesitation and anxiety due to their lacking knowledge and expertise in value addition such as milk pasteurization. In this sense many potential buyers of this technology perceive it less as an opportunity but rather more as a strategic necessity, a state of mind more likely to delay action.

Also, because, for many potential investors, the decision to invest could be driven by the fear of a potential raw milk ban that would otherwise put them out of business, it is clear that taking investment decisions based on this poses some risk as the government has as yet demonstrated a lack of serious will and commitment to actually implement this ban despite several threats and some attempts.

Cost: Dairy equipment is expensive. Not many in Uganda can easily afford it. This accounts in great part for the dominance of locally developed appropriate technology particularly in processing of Yoghurt. A summary of the costs of milk processing equipment available in the market is provided below.

³⁶ This is the perception from interviewing with a number of key stakeholders including raw milk distributors and retailers

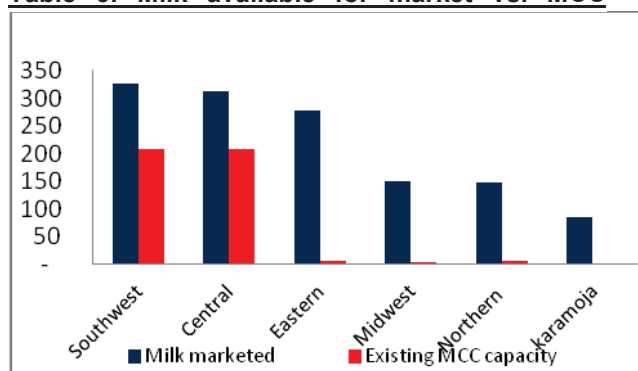
³⁷ Dairy Development Authority (DDA)

³⁸ All the leading transporters talked to have borrowed heavily to acquire the cold chain assets and infrastructure.

Table 5: Indicative Costs of Milk Processing Equipment

	DESCRIPTION	QTY	COST IN USD
1	500LPH milk homogenizer	1 unit	13,300.00
2	1000ltrs batch pasteurizer for milk	1 unit	18,900.00
3	500ltrs batch pasteurizer for milk	1 unit	12,300.00
4	10,000ltrs continuous flow pasteurizer (reconditioned)	1 unit	22,000.00
5	Automatic Pouch packing machine	1 unit	7,200.00

Source: Authors research from market vendors

Table 6: Milk available for market vs. MCC

Source: Livestock Study 2012

Strengths/Opportunities

Unmet and growing demand for Milk Coolers: Existing milk cooler infrastructure is insufficient. Apart from the south-western region, and to an extent the central region, the rest of the country is without proper milk collection infrastructure despite the proliferation of exotic dairy breeds to more areas countrywide, increasing milk production in formerly insignificant producing regions. Placing more coolers closer to farmers presents one of the biggest opportunities to stimulate increased value chain productivity.

Effective Demand for cooling facilities exists both from (i) Milk transporters who are keen to expand their footprint, and presently account for at least a third of all installed milk coolers in the country; (ii) Organized farmers- who are able to pool resources, as well as attract both private and public financing support to facilitate procurement of this equipment. A good example is the recent initiative by Uganda Crane Creameries Cooperative Union (UCCCU) in association with Scherjon⁴⁰, a Netherlands based supplier of dairy machinery. This initiative, in response to a demand driven request by organized dairy farmers⁴¹ aims to facilitate access to 100 milk coolers by 100 primary Dairy cooperatives, under a 50% subsidy. The rest of the 50%, of which the first 10% is required upfront, is paid by the cooperatives through borrowings.

³⁹ Dairy Development Authority

⁴⁰ Scherjon, a Netherlands based company, through a local subsidiary Innidigo, are now importing components, and locally assembling Milk cooling tanks. Under the contract to serve 100 coolers to farmer cooperatives in south-western Uganda, they are able to supply 3000 litre and 5000 litre units at € 17,000 and € 15,000 respectively. These prices are inclusive of generators

⁴¹ Supported by the Royal Netherlands Embassy in Uganda, and implemented by aBi Trust

This initiative demonstrates the growing capacity of farmers to effectively demand, and pay for high quality machinery.

Limited local manufacturing ability: All milk coolers are imported. There is presently no local capacity to build this machinery. The leading supplier of this equipment, Snowman's, deals mostly in 2nd hand equipment. There are also a few other small importers.

Table 7: Indicative costs of Milk Cooling Equipment

	DESCRIPTION	QTY	COST IN USD
1	10,000ltr brand new European made milk cooler with condensing unit	1 unit	48,600.00
2	5,000ltr brand new European made milk cooler with condensing unit	1 unit	30,800.00
3	500 ltr brand new European made milk cooler with condensing unit	1 unit	8,800.00

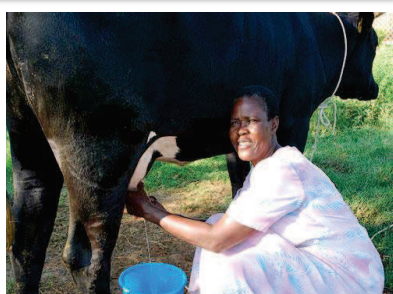
Source: Compiled from field visits

Table 8: Costs of Milk Cooling Equipment locally assembled by Inndigo

	DESCRIPTION	QTY	COST IN EURO	COST IN USD
1	5,000ltr Mueller milk cooler	1 unit	17,000	20,740.00
2	3,000ltr Mueller milk cooler	1 unit	15,000	18,300.00

Source: Inndigo

3.2.5 DAIRY MILKING MACHINERY



In Uganda, the milking of cows even under intensive farming systems still relies heavily on the use of manual milking. The penetration of milking machinery which according to experts can yield 15-20% more production, not to mention the control of harmful conditions like mastitis, is acutely limited.

The farming of cows is predominantly done as a family business in Uganda, and an estimated 1.7 million households, (25% of all Ugandan households) are cattle keepers⁴². Farming activities, including the milking of cows, therefore greatly relies on cheap and easily accessible family labour. At the time of an animal census conducted in 2008, it was identified that the use of family

labour for livestock rearing households was almost totaling at 99.1% with only 2.4% of such households also utilizing hired labour on their farms. It was also found that the overwhelming majority of households (92.7%) owned indigenous cattle, with a typical household owning about 6-7 cows. The total number of milked cows at 1.5 million constituted only 13% of the national herd (11.4 million cattle). Milk productivity as a result was significantly low with a show of only 8.5 litres of milk produced per milk per cow, translating into about 1.85 litres of milk per day. There are a number of important trends at play in reshaping the primary production node of the dairy value chain.

⁴² The National Livestock Census Report 2008

Strengths/Opportunities

Perhaps most important, is the *accelerated growth of the dairy herd in Uganda*, through the more widespread adoption of exotic breeds particularly the freisian-holstein, that is driven both by farmers themselves investing in direct response to strong market demand, as well as by public investors including the government⁴³ and Non-Governmental Organizations⁴⁴. The effect of this is the growing importance of intensive (zero grazing) and semi-intensive farming (paddocked dairy farms), as key features of primary milk production. These farm management systems increase the viability and economic potential for adoption milking equipment. The number of farms under these farming systems, with at least 25 dairy cows is not readily available but can be considered to be reasonably sizeable⁴⁵, particularly in the South-western part of the country.

Reduced availability of cheap labour, as family labour is less and less available, will increasingly influence a shift in primary production practices, from labour intensive manual milking methods toward the more efficient systems. Similarly, the consistent availability of “milkers”- individuals that hire themselves out as professional cow milkers was cited as becoming less so.

Organized Farmer groups; will increase access opportunities. As Dairy farmers are increasingly participating through well-organized cooperative associations, these associations increase options through which ownership of important machinery can be accessed. Groups can be a conduit that allows for cost reducing collective procurement, and access to credit where necessary. The well-organized Uganda Crane Creameries Cooperative Union, in South-Western Uganda, could provide a strong partnership in unlocking the milk machine market among the “ready adopters” within its members.

Weaknesses/Threats

Infrastructural bottlenecks: Even with the growth of commercial dairy farms with sizeable herds, clearly the primary constraint to adoption of this technology is due to the limited access to electricity at most farms which are based off the national power grid. Tapping into this potential requires innovations that address this key constraint- say for instance through manual⁴⁶, or solar powered milking systems.

Limited knowledge and practical experience: A key observation from interviews with farmers under intensive dairy management, for whom milking machinery would be viable, is that limited knowledge about the technology was a key constraint, catalyzing wariness to invest. Severally responses to the question of whether milking machinery would be a good investment were to the effect that “ I will not manage” or “ it is too expensive” or “that cannot work well”, among others. In all these cases, these perceptions were not based on practical knowledge, rather on hearsay or third hand experiences. The likelihood is strong that with effective demonstration of the benefits such a technology offers, conversion and demand will quickly result.

Price: although cited as a key constraint, at a price of about 2.5 to 3 million shillings (\$800-\$1000)⁴⁷ for a portable milking unit, this equipment may not really be above the capacity of many farms to afford.

⁴³ The dairy sector for instance is one of 15 prioritized commodity sectors under the DSIP, and one of the core activities earmarked for support under this prioritization is the improvement of dairy breeds.

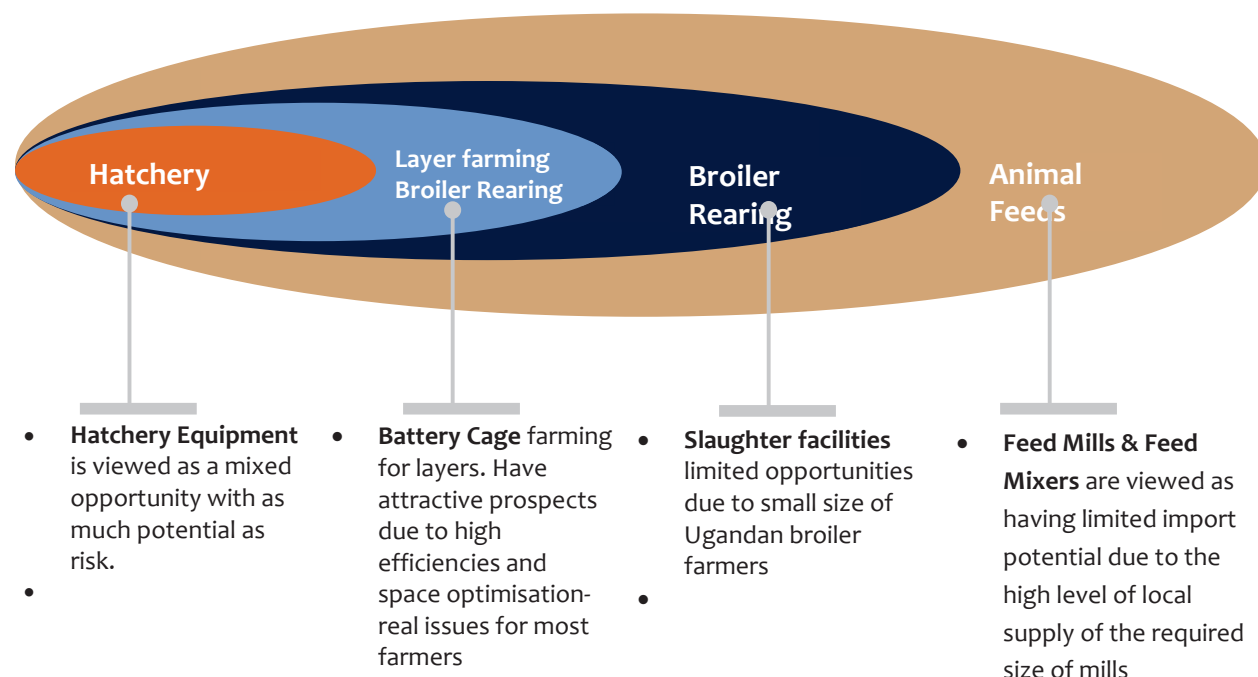
⁴⁴ The leading NGO’s supporting Primary production in Dairy include the East Africa Dairy Development Project (EADD), Heifer International, Send a Cow, SNV among several others

⁴⁵ A recent study indicated that there were about 8000 farms with herd sizes of dairy cows and above. While other industry experts dispute, this figure as too high, they equally agree that large dairy farms are on the increase.

⁴⁶ Manual systems would appear to exist and in wider use in neighbouring Kenya.

⁴⁷ Based on prevailing prices in neighbouring Kenya

Figure 6: Overview of machinery opportunities in Poultry Sector



3.2.5.1 Background

While the population of poultry⁴⁸ in Uganda is estimated at about 46 million birds⁴⁹, only a small fraction of this population relates to exotic breeds⁵⁰. The population of exotic breeds (commercial layers, broilers and parent stock) is dominated by broilers (70%), followed by layers (20%) and breeding/parent stock (10%). Farming systems of exotic birds include both intensive and semi-intensive regimes that require varying levels of agri-machinery investments. The commercial poultry sector is under robust and accelerated growth, both in the layer as well as the broiler categories. The following agri-machinery import opportunities are sighted.

3.2.6 POULTRY-HATCHERIES

Strengths/Opportunities



Overall Robust growth of the poultry sector: The commercial poultry sector is under robust and accelerated growth, both in the layer as well as the broiler categories, which implies increased pressure on the production capacity of Hatcheries. Growth for broiler meat has been boosted by the major driving forces of

⁴⁸ While the poultry sector in Uganda comprises a number of different types including turkey, duck, geese, and ostrich, it is chicken that provide most economic activity and income opportunities for Ugandan farmers

⁴⁹ The 2008 Livestock census estimated poultry population to be 37.5 million growing at an annual rate of 3%.

⁵⁰ The greatest percentage –about 90%- of chicken are indigenous (local) types, reared predominantly (97%⁵⁰) by households under free range farming systems - therefore with virtually no requirements and investments in any form of agrimachinery

population growth, urbanization, increased purchasing power and changes in consumption and lifestyle patterns. In addition chicken meat is becoming relatively more affordable than other protein sources, with a kilo retailing presently at many outlets for about or slightly less than the price of beef⁵¹. Nevertheless, the per-capita consumption of chicken in Uganda has been estimated at about 1.7kg/person/year, versus that of South Africa of about 32kg/person/year- indicating yet more space for growth. The demand for eggs has grown to a significantly higher level over the past few years driven by increasing and sustained demand from neighbouring countries- particularly- South Sudan⁵², and Kenya⁵³. Citing the specific example of Dr. Ochola, the promoter of Asiima Agri-concern, a large integrated poultry business; from 2012, the size of his business has more than doubled, and even then he is unable to satisfy demand for his products. Similarly several other farmers interviewed, are actively expanding their operations on the basis of their inability to service existing markets.

Existing Hatchery Capacity: It is a common thought among most industry actors that the present supply of Day old Chicks (DoC's), is falling far short of existing demand, and the major reasons supporting this thinking is the extensive waiting times experienced by most farmers from order placement to supply which ranges anywhere between 30 to 90 days. According to a fairly recent study⁵⁴, there are at least 13 commercial hatcheries with a combined minimum capacity of only 510,000 eggs a week. In addition to these are several small-scale hatcheries. Taken collectively, it is suggested that there is sufficient local capacity for the production of DoC's. The Industry however is inadequately serving existing markets. The local demand for DoC's by 2012⁵⁵, was estimated at 15 million⁵⁶, of which 11-12 million were locally supplied, with the remaining 3-4 million chicks imported⁵⁷. While major hatcheries have expanded existing capacity, the significant demand and supply gaps signal prospects for viable entry of new hatcheries.

Limited capacity for local Manufacture of Hatcheries: Hatchery machinery is predominantly imported. Supply appears dominated by Chinese and Indian imports, with a cross section of hatchery owners interviewed indicating a satisfactory level with the performance of this equipment. There is only one notable local manufacturer of hatcheries - Butenga Chick Star Ltd - whose key competitive advantage is his ability to supply smaller sized hatcheries. Growth in demand for hatchery capacity to meet the fast growing demand for poultry products will be continue to present opportunities for imports.

Weaknesses/Threats

Significant other investment is required beyond purchase of Hatchery: Hatcheries in Uganda are largely operated as part of an integrated unit that involves a parent stock farm. It is a complex and highly intensive business to operate a successful hatchery. In the experience of one of the leading DoC

⁵¹ Analysis derived from field research conducted during study: A Chicken weighing about 1.5 kgs is sold for about 12,000 shillings implying a per kilo cost of about 8,500 shillings versus the cost of a kilo of cow or goat meat at 9,000 and 10,000 respectively

⁵² South Sudan relies on Uganda for much of its food needs. Early forays into agricultural production are being hampered by the recent return to civil conflict in the country. The country is expected to remain heavily dependent on food imports from neighbouring countries for the next several years.

⁵³ One of the farms interviewed with a poultry layer capacity of 300,000 birds under battery cage systems are targeting Kenya as a strategic market. This company cites that close to 10 trailers make the journey between Kampala and Kenya every day ferrying eggs from Uganda.

⁵⁴ Identification of Investment opportunities in the livestock sector, 2012

⁵⁵ More recent demand statistics are not readily available, but based on the growth by many of the industry actors talked to, can be assumed to have increased significantly

⁵⁶ Export demand is not known, but major hatcheries like Ugachick are exporting across borders to Kenya, Rwanda, Congo and South Sudan.

⁵⁷ Identification of investment opportunities in the livestock sector, 2012

producers⁵⁸, a hatchery operation needs to ensure among others: high levels of biosecurity and hygiene, ensure a steady inflow of quality fertilized eggs, qualified and experienced personnel, and adequate and full time power⁵⁹; all of which suggest a fairly heavy level of investment beyond simply the acquisition of egg hatching equipment. There are however several small scale hatcheries that have been established, many being stand-alone hatcheries that provide a hatching service to farmers with no reliance on an own parent stock unit. These hatcheries normally tend to cater for other types of fowl rather than exotic breeds, such as ducks, Kuroilers, and geese; or tend to exist, and survive in far out places that are unserved by the mainstream hatcheries. The survival rate of small scale hatchery rates is however dismal, which is understandable considering the tough conditions necessary to manage this kind of business.

Biosecurity concerns limit attractiveness of Small scale hatcheries: The quality of DoC's is an important consideration especially among the medium and large scale, well-established farmers. For such customers biosecurity standards and therefore avoidance of transferable diseases is better guaranteed by relying on long existing hatcheries with established reputations. This has resulted in a significant capacity expansion by the major hatcheries⁶⁰. However, small hatcheries still play a key role. According to sector experts, close to 90%⁶¹ of orders for DoC's are for sizes between 100 to 500 birds. These smaller sized customers are less sensitive to biosecurity considerations, and are not only more flexible in terms of where they source DoC's, but are equally more price conscious. The structure of the market therefore supports entry of more hatchery businesses.

The major considerations of the dominance of major hatcheries, perceptions of biosafety risks associated with small scale hatcheries and the implied extended investment costs to set up a competitive hatchery temper the opportunity of hatchery agri-machinery, limiting this business to very few. Equally the rapid growth of the sector positions poultry as a key strategic trade and investment opportunity.

3.2.7 POULTRY- BATTERY CAGES



Strengths/Opportunities

Use of battery cages in the farming of layers is a relatively recent development in Uganda, but one that is growing increasingly important. The adoption of battery cage systems is still not widespread, with the majority of farmers still using the deep litter system. The battery cage system is however attaining more recognition for its significant potential for increasing farm efficiency, and productivity.

In particular, attractiveness, and potential demand for battery cages is driven by its ability to reduce bird infections and illness and the associated costs and losses, simplify the process of egg harvesting and enable the identification and culling of unproductive birds- thereby increasing productivity of remaining stock. Further, they enable stock takes on a regular basis thereby curbing losses through theft by employees (a common and rampant problem) and improve feed conversion due to limited bird

⁵⁸ Phone conversation with Mr. Aga Sekalala, Managing Director of Ugachick, one of the oldest and most successful integrated poultry farms

⁵⁹ An incubator cannot be off power for more than 4 minutes, and therefore a standby generator is essential

⁶⁰ Biyinzika International has expanded recently into 2 hatcheries with an increased total capacity of 1.6 million DoC's while Asiima Agri-concern indicate that they have doubled their size since 2012.

⁶¹ Discussions with two leading hatchery owners of Ugachick and Asiima Agriconcern

movements. Other benefits also include reduced feed wastage due to spillage⁶², and an added level of security from external thefts as the cages can also be locked.

Ready and willing to invest consumer segment: The attractiveness of this opportunity is in the potential size of the market. Battery cages will appeal to farmers who experience space and manpower constraints and aim to attain high productivity and efficiency levels. These attributes describe a significant portion of the urban based small farmer segment. This technology equally appeals to the corporate farmer⁶³, for whom productivity and efficiency are important, and who has resources to invest. With appropriate pricing, and promotion to increase awareness and key benefits, the battery cage is viewed as a very attractive trade opportunity, only tempered by prevailing⁶⁴ negative perceptions around the cage farming system by stakeholders in the Netherlands and other EU communities.

Weaknesses/Threats

Affordability: Despite the long list of benefits, battery cages are currently perceived as too expensive for the ordinary farmer. The current price for a 100 bird capacity cage is about UGX 2,000,000 (\$650). This price while possibly high for many small scale actors is quite affordable to a good section of the market. In addition, it is clear as well that the importers currently holding stock in this equipment are pricing⁶⁵ it exorbitantly, possibly taking advantage of the early adopter excitement in the market.

Concerns over Ethics of Battery farming systems: It is important to note that in most of the EU, the free range farming system is preferred to the caged chicken farming technique, and it is possible this could bear upon the suitability of battery cages as a trade opportunity

3.2.8 TRACTORS-CONVENTIONAL 4 WHEEL TYPE



The role of tractor tillage in the transformation of farming in Uganda, and the productivity of farm activities cannot be overstated. Tractors and all its associated implements are among the most important elements of mechanization, and are critical in any serious national effort to unlock the full potential of Uganda as an agriculture-led economy.

Strengths/Opportunities

Growing demand by commercial farmers: Purchase statistics of tractors are not readily available (although import figures are cited further below). However, it is reasonable to conclude that the main actors with the capacity to afford tractors are the large agricultural estates such as sugar, tea and palm oil plantations⁶⁶. While these are heavy users of tractor and other heavy machinery, they also have well developed procurement systems and tend to import their specialized machinery directly. Next to these are the commercial farms such as large scale maize and rice farms or semi-intensive dairy farms. Such farms whose number is estimated at least 400⁶⁷ and rapidly growing, have access to both internally

⁶² Experts place spillage in deep litter systems at about 10-15 grams per bird per feed

⁶³ There is a crop of emerging young middle class “farmers” looking for opportunities to invest in Agriculture but from a “modern” perspective, and therefore adopting improved and highly efficient methods and processes of farming. This category of consumers, is resource endowed, and with easier access to knowledge (Internet, support groups etc). This group is therefore keen to adopt intensive farming practices, but also able to afford these technologies as well.

⁶⁴ This was a learning from early feedback sessions with the EKN

⁶⁵ Against a selling price of \$650, an online search of china exporters, where most battery cages are sourced indicates an average FoB price of \$100. Even allowing for freight, Insurance and tax, it is evident that importers are making margins of up to 200%

⁶⁶ This is validated by import statistics that show that estates are heavy direct importers of tractor and other agri-machinery.

⁶⁷ Census of Business Enterprises 2010/11

generated cash flows as well as easier access to external financing available to facilitate tractor purchase. Such farms tend to source their machinery from the locally available suppliers, and are a very important target group for any tractor selling firms.

Organized farmer groupings: such as cooperatives and farmer associations are bringing small farmers into formal and organized structures that are financeable, and create collective capacity that not only makes investments in machinery feasible through the pooling of cash resources, it equally creates a workload that is viable and attractive to tractor hire service providers.

Increasing penetration of tractor hire services: Tractor hire services are extremely important as a model that unlocks access for tractor machinery. These business models present interesting avenues toward affordably, profitably and sustainably increasing access of tractor services to small scale farmers because they provide readily available access without the necessity of ownership. Further, tractor hire services not only provide an efficient land cultivation service than animal or hand powered systems, they are in fact cheaper than both. For instance, tractors require only 3.75 tractor hours for the primary cultivation (ploughing and harrowing) of a single hectare of land versus 40 hours required when using a team of oxen or 750 hours when done manually with the hoe⁶⁸. Based on the practical experiences of Ladwong Farming Limited, a tillage service provider in Northern Uganda, it costs about the same UGX 80,000 (\$27) to hire either a tractor or alternatively ox plough services to clear an acre of land in Northern Uganda. However, in the case of ox- plough services, it usually takes 3 days, and ultimately requires some additional costs relating to free meals and some light alcohol that would usually be provided for the crew of usually 3 persons manning the ox-ploughs. Use of hired labour will on the other hand usually not cost less than UGX 100,000

Tractor hire services have evolved from simple - one man with a tractor for hire operations - to well-structured services provided by formalized enterprises. The implications of this are important, because formal entities contract with tractor selling or leasing firms, and access external financial support, which can attract public (Donor/INGO) investments as credible institutions with good governance practices. Such companies therefore present a viable market for affordable good quality 2nd hand tractor imports.

Tractors are predominantly imported with limited local manufacturing capabilities. Recent statistics indicate that the major country of origin for tractors is India, accounting for as much as 60% of imports. Attempts at local manufacture through a Uganda-Iran (UGIRAN) partnership have since failed to take off.

Imports of tractors in Uganda have been low, but steady. An analysis of import statistics of tractor machinery indicates that up to 395 and 440 tractors were imported into Uganda in 2013, and 2014 respectively. The average price of a new tractor purchased from among the major tractor retailers in Uganda⁶⁹ ranges from **UGX 81 million (\$27,000⁷⁰)**, to **UGX 145 million (\$48,490⁷¹)**. This is affordable for very few Individuals and commercial farms, and creates a gap that could be filled by high quality 2nd hand imports.

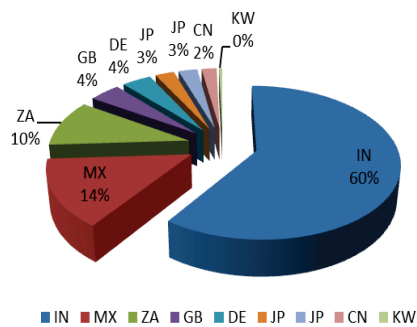
⁶⁸ Stakey & Verghaeghe, 1981:

⁶⁹ Leading Tractor retailers in Uganda include (i) Engineering Solutions -Massey Ferguson tractors, (ii) Cooper Motors -New Holland tractors, TAATA

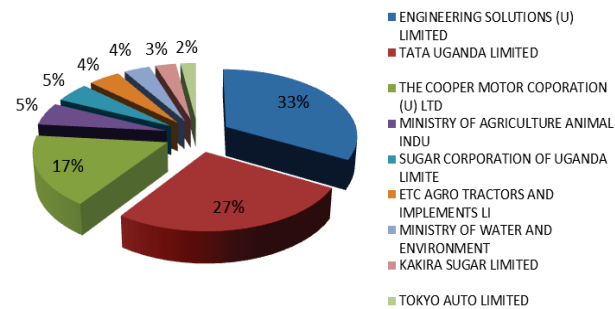
⁷⁰ Based on a quotation of a TT 75 4WD New Holland Tractor from CMC.

⁷¹ Based on a quotation of a Massey Ferguson MF290Xtra-2WD Tractor.

Tractor imports 2014



Tractor importers 2014



Weaknesses/Threats

Tractors are expensive and will remain so for the majority of Ugandan farmer's thus perpetuating low demand and low usage levels. In fact, most Ugandan farmers rely predominantly (90%) on the use of manual tools; to a lesser extent (8%) on the use of animal traction technology and to a very limited extent (2%) on mechanized (tractor) machinery to carry out farm operations⁷². Consequently, Uganda is estimated to have only 1.5 tractors per 10,000 hectares, versus a recommended FAO standard of 20 tractors. In comparison to her neighbours, Kenya, by 2009, had 25.2 tractors per 10,000 hectare of arable land, with Tanzania having a similar penetration level of 24.7 tractors per 10,000 hectare of arable land. Rwanda is much closer to Uganda, at a penetration of only 0.5 tractors⁷³.

Tractors are not suited to some local situations: Tractors will be optimized in farming systems where land is generally flat, and where meaningful land holdings rather than tiny plots are worked. These conditions are found more in the Northern and Eastern regions of the country, and less so in the South-Western region, which tend to be hilly, and more congested- taking Kabale- one of the major districts as an example. While it will always make commercial sense for a commercial farmer to invest in such a technology regardless of his location, and land characteristics, this applies less to tractor hire services, which could be more effective in more tractor friendly terrain.

⁷² Cited by several literature, including the Agricultural Sector Development Strategy and Investment Plan (DSIP)

⁷³ World Bank: World Economic Indicators, 2015.

3.2.9 TRACTORS- WALKING TYPE



Strengths/Opportunities

Walking tractors are available in Uganda, and are supplied by several of the leading agri-machinery importers. Depending on capacity, walking tractors cost between 4 to 6 million shillings (\$1,300-\$2,000); these are primarily imported from China.

In the experience of smallholder farmers, walking tractors provide more productivity than animal traction systems. Walking tractors can also be retrofitted with several implements to support a wide range of on farm services.

The walking tractor is an initiative supported by the government through NAADS, and other arms; however there is no accessible information disclosing the demand by private individual buyers.

As on farm incomes and profitability increases, walking tractors are a natural progression from animal traction systems.

Weaknesses/Threats

As an import opportunity, it is important to note that the Chinese and Indian importers are already well established in the supply of this machinery.

3.2.10 HORTICULTURE- GREENHOUSE EQUIPMENT



Background:

Green house technology in Uganda is used in the flower industry by the growers and exporters of both roses and chrysanthemums and the growing of horticultural products hot peppers for export, and local markets (particularly sweet pepper, tomato and cucumber). The flower sector, comprising of some 13

farms, and on a collective acreage of about 200 hectare⁷⁴, is quite mature having been established in the early 1990's and presently experiencing limited growth. Uganda flower farms many owned by Dutch growers, have well established supply relationships for their greenhouse infrastructure, and on account of this as well as limited growth prospects, no viable trade opportunities can be established to service this category. The opportunity explored here is therefore for small greenhouses for horticulture.

Strengths/Opportunities

Competitive advantage of greenhouse farming makes it attractive: The greenhouse effect achieved by growing vegetable under greenhouse can significantly boost performance. Greenhouse farmers will typically experience extended harvesting periods of (up to 8 months for tomato and sweet pepper), a faster growth to harvest stage (e.g. 55 days for tomato, instead of 100 days for outdoor farming), and a generally better quality of crop, due to minimized exposure to wind-borne diseases. This provides significant competitive advantages particularly through year round production, and increased prices in the dry season, when supply from rain fed farmers declines.



Greenhouse farming is profitable business: According to sector experts⁷⁵, it will cost up to UGX 7.5 million (\$2500) to construct a local (wooden) greenhouse and stock it with crop, of say tomatoes, or sweet pepper. As it is possible to harvest at least 6,000 kgs⁷⁶ of tomatoes under a greenhouse, a farmer could earn UGX 10.8 million (\$3,600) in income from a local greenhouse in the first year alone⁷⁷, sufficient to meet the initial costs of investments⁷⁸.

⁷⁴ Uganda Flower Exporters Association (UFEA)

⁷⁵ Discussions were held with experts involved in selling the Green house farmer Kit, additional information from authorities cited in leading newspaper publications

⁷⁶ This makes greenhouse production (under for instance 135 sq. meters) of tomato more productive than farming on an acre (4046 sq. meters) in the open.

⁷⁷ Whereas there is a readily available market, success is based very much on farmer's initiative.

⁷⁸ Within 2 years, if allowing for other direct (fertilizer, energy costs pesticides) and indirect (salary to farmer) expenses.

Trade in imported Greenhouses is profitable: Imported metallic greenhouses provide similar benefits and more, not least because they provide a longer life span of 6 years before the polythene needs to be replaced. Balton, the leading supplier of metallic greenhouses under their Farmers Kit package, are able to supply and install a greenhouse complete with the irrigation unit and sufficient feeds and pesticide for the production of a year's crop. This package is currently offered at UGX 14.5 million (\$5,000)

Table 9: Cost breakdown of Balton Uganda- Greenhouse farmer Kit

Equipment	Uganda shs	\$
Green House & Installation	10,550,000	3,517
Irrigation sytem	540,000	180
Tank	270,000	90
Knapsack sprayer	150,000	50
Safety suit	230,000	77
Cost of equipment	11,740,000	3,913
Plus feed & fertilizer	2,760,000	920
Total cost of farmer kit	14,500,000	4,833

Middle class or “corporate” farmers present viable demand opportunities: The typical target market for greenhouse farming is the middle class community who are looking towards agriculture as an income diversification strategy. These farmers have or can access the required level of initial investment and are excited by smarter ways of farming. Further, they are also likely to have limited land that they want to use in the most productive way possible. Most importantly, this type of farmer would also have better access to both upscale (supermarket) and mainstream (roadside) markets.



Pressure from EU Markets to conform to Phytosanitary standards: Conforming by Uganda's horticultural exports to EU Phytosanitary standards⁷⁹ is becoming an increasing concern, and continued access to the lucrative EU market will depend on the sector's ability to export pest free commodities. Achieving this quality by keeping to the normal practice of farming out in the open may not be easily achieved. By June 2014, Ugandan pepper exports to the EU had been intercepted 31 times with harmful organisms' prompting the EU to notify the Ugandan government of a proposed embargo on peppers to the EU. The government of Uganda has since taken stern measures to rein in the situation, including a self-imposed ban⁸⁰ by the Ministry of Agriculture, Animal Industry and Fisheries on pepper exports. The primary 'harmful organism' intercepted is the *false coddling moth*. As a commonly occurring insect, one of the ways to mitigate exposure and risk of interception could be through increased production of export grade hot peppers under greenhouse⁸¹ infrastructure.

⁷⁹ The hurdles to pass (HTP) in the EU market for fruits and vegetables are 11 that must be complied with to gain and maintain access to EU markets. These include among others: parasitic infection (such as the false codling moth), pesticide residues, mycotoxins, foreign bodies and radiation.

⁸⁰ <http://www.observer.ug/business/38-business/37685-govt-bans-export-of-hot-pepper-to-eu-market>

⁸¹ Only two farms (i) Kajjansi Roses Ltd and (ii) JP Cuttings Ltd are growing vegetables (peppers) under greenhouses spanning more than one hectare (2.4 acres)

Weaknesses/Threats

Price: At the prevailing price points, greenhouses will probably remain too expensive to scale out to the majority of farmers, but the growing interest by the middle class community towards farming presents a viable market to support increased trade of greenhouse.

Scale of Greenhouse required to invest for export is prohibitive: The size and costs of greenhouses that would be required to provide cover for peppers grown for export, would be significant, especially in relation to the typical pepper farmer, who are small scale producers.

4 Key Actor Analysis

This section details the key stakeholders that influence the direction of innovation, technology transfer, production and marketing of agri-machinery. Stakeholders are categorized into Public Institutions and Authorities, and Private Sector Actors

4.1 Public Institutions:

Uganda Research Industrial Institute:

The Uganda Industrial Research Institute is an autonomous public institution that describes itself as a centre of excellence for the East African Community in industrial research. This institution is a leading national entity in the championing of innovations and application of applied research, and develops products and industrial processes aimed at enhancing the nation's Industrial capabilities.

The Institutes core activities revolve around (i) *Business Incubation*- through which several startups have been nurtured to develop competitive products, and sustainable businesses; (ii) *Pilot processing plants*- hands on training facilities through which local entrepreneurs are supported to produce ready to use products (iii) *technology development*- which provides a sorely lacking service in Uganda- quality equipment maintenance, repair and refurbishment (iv) analytical laboratory services, (v) value addition and product development- the institution acts a central point for identifying new uses for existing raw materials, improvement and adaptation of materials to higher technology application and develops an integrated matrix for value addition; (vi) *Skills training*-UIRI also offers hands on skills training in diverse areas such as metal fabrication, carpentry and food processing among others; and (vii) *Business consulting and advisory services* to entrepreneurs.

The institute boasts some of the most advanced machining equipment in Uganda, and is one of the few that is ably resourced to handle stainless steel based fabrications. With these UIRI has been able to develop some high quality agri-machinery prototypes. As with most innovation institutions, the centre faces the challenge of commercialization of such innovations, citing the technical and resource weakness of the private sector (local fabricators) to take up and commercialize these innovations⁸² The centre is said to be in early stages of setting up a multi- million machining and manufacturing centre that will be located, in the Uganda Industrial Business Park, within the Central business District. Once completed, Uganda through UIRI will be in a strengthened position to make more complex and higher quality machinery, and machine parts- such as motors- that presently need to be imported, overall serving to make quality machinery in Uganda more accessible and affordable.

UIRI welcomes partners who wish to create synergies to improve the agri-machinery and Industrial landscape of the country.

Agricultural Engineering and Appropriate Technology Research Centre (AEATREC)

AEATREC is a research unit under the National Agricultural Research Laboratories (NARL) in Uganda, whose mission is to generate and promote agricultural technologies and improve productivity, value addition, income and food security. AEATREC's innovative research is focused in four main areas: (i) Farm Power and Mechanization Systems (ii) Agricultural Processing (iii) Household Energy Systems and (iv) Water harnessing Systems.

⁸² The Centre has the advanced capacities to apply scientific knowledge, adopt safety and other quality considerations into prototype design. These prototypes eventually become too complicated for the ordinary fabricator to design- due to their lack of similar technical expertise, inadequate machining technology; and importantly due to the absent incentive to deliver to a high level of quality not appreciated by an unsophisticated and price conscious market.

AEATREC's innovations address technology gaps at the primary production level from land opening to post harvest handling. Important to observe is that AEATREC responds to carefully identified⁸³ needs in the communities, and engineer's equipment and machinery targeted to those needs. Because needs assessed do not necessarily reflect effective demand, the adoption and commercialization of several valuable innovations remains extremely limited⁸⁴. An important question along the journey to mechanize primary agricultural activities is therefore how technology transfer mechanisms can be strengthened. One way AEATREC is addressing this is through active participation in bids for supply of machinery.

Ministry of Agriculture Animal Industry and Fisheries (MAAIF)

As the government institution that oversees agricultural development, MAAIF is responsible for the implementing the GoU's Agriculture Sector Development Strategy and Investment Plan. This plan provides clear strategic direction as regards further Mechanization of on farm activities. MAAIF implements directly and also works with other (both public and private) stakeholders to implement Farm development initiatives.

Ministry of Trade Industry and Cooperatives (MTIC)

MTIC oversees the development of the Processing and Value addition sectors of the economy, and orchestrated, in consultation with other stakeholders, the National Industrial Policy (2008) and the National Industrial Sector Strategic Plan (NISSP). These policy and strategy guidelines aim to build the industrial sector into a modern, competitive and dynamic sector fully integrated into the domestic, regional and global economies.

Uganda Investment Authority (UIA)

UIA is an autonomous public institution, responsible for overseeing and facilitating investments in Uganda. UIA is therefore responsible for the issuance of Investment licenses on behalf of the GoU. To streamline the process of business registration, that has been identified as a major bottleneck to doing business in Uganda, the UIA is now integrated as a one stop centre, where anyone wishing to register a foreign or local business can be assisted in a timely manner. This is therefore an important first stop for any foreign company wishing to start trade operations in Uganda.

The core agencies under the UIA One stop Centre include:

Table 10: Core Agencies under the UIA One Stop Centre

Agency	Role
Uganda Registrations Services Bureau	Company Registration
Uganda Revenue Authority	Taxation Issues
National Environment Management Authority	Environmental Compliance
Directorate of Citizenship and Immigration Control	Work Permits, Visas, etc.
Lands Ministry	Land ownership, Verification
Uganda Investment Authority	Investment License

Government is also developing an integrated on line system (electronic one stop centre) that will link all the government agencies that deal with licensing business in Uganda so that a potential investor does not need to waste time and money in duplicating paper work for various registrations. In the interim,

⁸³ Primary steps in the process involve active engagement and surveys across wide user groups to determine gaps, innovation and testing with the active participation of end users, applying feedback into final prototype design.

⁸⁴ Once prototype is approved, the mandate of AEATREC would previously end with next steps involving the engagement of private sector- local manufacturers and fabricators. Local manufacturers however respond to innovations with existing demand, rather than see themselves as orchestrators of demand. Additional challenges in technology transfer through private sector actors have been found in the frequent change in original design to as cost cutting measures- ultimately however compromising quality, and reputation of product. Trainings and sensitization are some of the strategies AEATREC performs to achieve greater private sector engagement

the Investment License as well as other investment needs like industrial land can be applied for online via the UIA website www.ugandainvest.go.ug

Uganda Revenue Authority (URA)

The URA is government revenue collection agency established by the Parliament of Uganda, and is responsible for enforcing, assessing, collecting, and accounting for the various taxes imposed in Uganda. Any Individual and Company conducting business in Uganda will have to formalize a relationship with URA through the application of a Tax Identification Number (TIN).

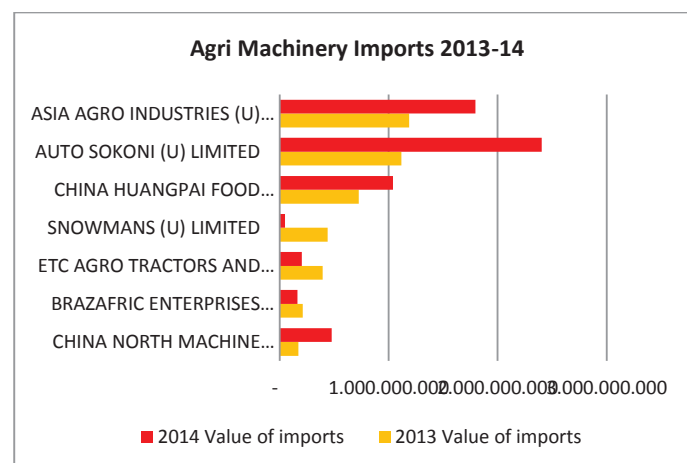
Uganda National Bureau of Standards (UNBS)

UNBS is a statutory body under MTIC and has been in existence since 1989. It is governed by a National Standards Council. The Mandate of UNBS is to (i) formulate and promote of the use of standards; (ii) enforce standards in protection of public health and safety and the environment against dangerous and substandard products;(iii) ensuring fairness in trade and precision in Industry through reliable measurement systems; and (iv) strengthening the economy of Uganda by assuring the quality of locally manufactured products to enhance the competitiveness of exports in the regional and international markets.

4.2 Private Sector Actors

4.2.1 Importers

Food processing machinery suppliers: The major importers of the common types of agri-machinery especially that used in the food processing bear similar characteristics. The companies are mostly either Chinese or Indian owned, and they trade in similar products, predominantly sourced from China- including the firms owned by Indian proprietors.



In this regard, the two firms highlighted below give a flavour as to the attributes of the key players in agri-machinery import segment

Auto Sokoni & Agro Sokoni:

Sister company's, these firms import a whole range of machinery spare parts ranging from auto motive parts, maize mills, rice hullers, maize hullers, feed mixers, engines and mortars. Most of their engines are imported from China and so applies to the machines. Interesting to note is that though owned by Indian proprietors, most of the machines sold are sourced from China. This highlights the competitiveness of

Chinese imports in the Ugandan market. These companies are affiliated with sister operations in Kenya, from where fabrications of some machinery is done. This is the biggest importer of food processing agri-machinery in Uganda.

China North Machines:

China North Ltd is a Chinese company that imports an assortment of machines at a very competitive price and usually the lowest price. It achieves massive sales since Ugandans are price sensitive. They also deal in machine parts and receive orders for any machines required and deliver them to clients in Kampala. They have 2 showrooms on within the Central Business District of Kampala.

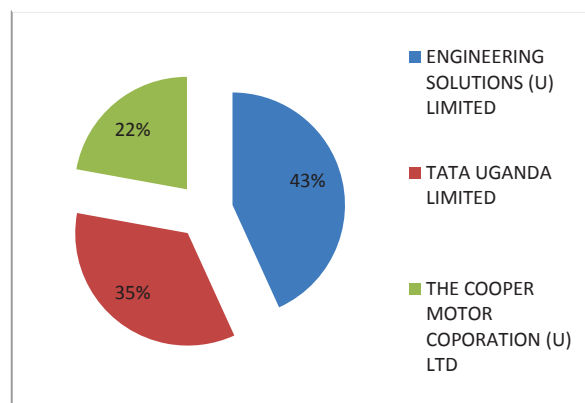
Other importers:

Dairy Machinery Importers: there is presently one leading supplier of dairy equipment in Uganda, Snowmann Ltd. This company sells both new and used equipment. They have a dealership with Du Pont and a range of European suppliers. Apart from coolers, homogenizers, tanks, packaging materials among others they too offer maintenance services. They are located on 7th street industrial within the Central Business District.

Tractor selling Companies:

The 3 leading tractor companies include (i) Engineering Solutions- sellers of Massey Fergusson tractors; (ii) Taata Uganda (iii) and Cooper Motors Corporation- the sellers of New Holland Tractors. Engineering Solutions is the market leader tractor supply in Uganda. The figure below illustrates their relative positioning against one another. They are all significant players in the market.

Figure 7: Share of market among the leading tractor sellers



4.2.2 Local Manufacturers

There local fabrication Industry comprises hundreds of actors, widely dispersed across the country, closer to potential customers. This section highlights the most important actors, with potential for synergy and partnership with Dutch traders.

Tonnet Agro Engineering Co. Ltd

Perhaps the most competitive of the local fabricators, is a company offering agro and food processing machinery and equipment, agro- implements, and spare parts. Started in 1995, it is a formally registered company with membership under USSIA, and UMA. Products of well-respected quality are produced, and

the company in addition to marketing products to local agro-processors and farmers is regularly engaged by Institutional buyers such as GoU, WFP, and it also exports products to neighbouring countries including Rwanda, Kenya and Southern Sudan. Tonnet is one of local fabricators with a well-structured workshop layout and management systems and controls.

Tonnet has expressed interest in and is actively seeking partnerships with foreign companies, under which local assembly of quality agri-machinery can be made.

Central Engineering Ltd

They are located at the outskirts of the Central Business District, Kampala. The company has not set up a planned workshop layout to allow systematic production. Like most workshops or fabricators, they produce on order and therefore have no finished products on the shelf but have prefabricated parts for the fast moving machines like the maize mills and hullers. They employ about 6 fabricators each with different specialties, though, they all weld but the level of skill varies with the complexity of machines.

The most produced machines are maize mills, hullers, feed mixers, dough mixers and ovens respectively. They use basic machines like arc welders, angle grinders, pillar drills, hand drills and sheet rollers. They deal with largely mild steel and there is limited knowledge of the importance of stainless steel by their clients. There is no deliberate effort to educate and give options about the use of food safe materials.

Musa Body Machinery Ltd

It is located in Katwe a busy fabrication hub of Uganda and is one of the oldest fabricators in the business. Musa Body Machinery is famous for being among the first to innovation locally appropriate technology, contributing to the development of local industry. Due however to competition from cheaper, better finished and increasingly accessible imported machinery from China and India, Musa Body has opted to participate in the import and trade of agri-machinery imports. Key imports sold include; sachet packaging machines, dough mixers, bottlers and catering equipment. They still fabricate the maize mills, hullers, ground nut shellers, feed mixers, juice extractors and coffee hullers. The agro processing machines are also made on order because different clients have different and often specialized needs. They also depend on the basic typical machine tools like arc welders, drills, benders and rollers.

Ramanand Ltd

This is an Indian owned company on 6th Street Industrial Area Kampala, which fabricates agro processing machinery and imports the same. They have a great foothold of the market and make products for commercial farmers. Ramanand produces maize mills, huller, rice mills and polishers, ground nut shellers and feed mixers. The specialized machinery made are the commercial dryers and silos. These are imported and assembled by the company at the client's site since there is limited demand and the number of customers is not sufficient to sustain the daily production of these machines. Ramanand also engages in aluminum profile fabrication. From the visit at the site, it could be seen that most of the items are imported and what is engaged in here is assembling. For this reason, prices are also quoted in US Dollars..

Technology Research Network Ltd

This company is situated in at the outskirts of Central Business District, Kampala and employees about 6 fabrication experts and calls in specialists depending on the work. This is one of very few companies with what can be described as specialized because it does actual engineering design, 3D modeling and then fabricates machinery on behalf of the client. They are specialists in stainless steel, factory maintenance and automation. They produce literally all machines but the main machines are maize mills, ovens, hatcheries and food dryers. The kinds of machine tools in use are the arc welding, drills, grinders, rollers and benders. In the event of specialized work, they sub contract the work to skilled people in other institutions.

5 Financing for Agri-Machinery

*A developing economy can often generate rapid spurts of economic growth over the short term based on investment in services and construction, but long term growth and structural transformation is almost always led by the manufacturing based export sectors*⁸⁵

5.1 Overall State of the Uganda Financial Sector:

Uganda's financial sector is relatively well developed and comprises a (i) formal (ii) Semiformal and (iii) an Informal sector. The **formal sector**, regulated by the Central Bank, comprises of 25 Banks, 4 Credit Institutions and 4 Microfinance Deposit-taking Institutions (MDI's). This sector also includes Insurance companies, Pension funds and Capital Markets.

The **Semiformal sector** which includes (i) Microfinance Institutions and (ii) Savings and Credit Cooperative Organizations (SACCO's) also plays an important role particularly in extending access to financial services to Individuals and enterprises that are excluded from the formal financial sector. The 130 MFI's and over 2,000 SACCO's dispersed around the country are therefore performing an important role- catalyzing financial inclusion- to millions of rural and small scale micro entrepreneurs.

It is estimated that about 85%⁸⁶ of adult Ugandans are included within this formal financial system. Unfortunately, many Ugandans (15%) remains financially excluded. These will typically be the rural poor living on less than a dollar a day.

Financial Institution		Number
Formal	Banks	25
	Credit Institutions	4
	MDI's	4
	Insurance Companies	23
	Uganda Stock Exchange	1
Semi Formal	MFI's	130
	SACCO	2065

Figure 8: Categorization of Financial Institutions in Uganda

5.2 Supply of Financial Services relevant for Agri-Machinery

While an increasing number of financing options and products are available to the private sector, this section focuses on the Banking and Microfinance sector as the most relevant for financing Agrimachinery in Uganda.

5.2.1 Banking Sector

The Ugandan Banking sector remains the dominant and most important source of financing for Uganda's private sector. This is therefore the primary source of financing of Agri-machinery investments. Banking sectors capacity to finance the private sector has evolved catalyzed by some notable achievements; (i) First, the banking Industry has experienced an impressive expansion in the branch network⁸⁷, to about 371 branches as of 2014, bringing financial services closer and more accessible to

⁸⁵Dr. Louis Kasekende, Deputy Governor Bank of Uganda

⁸⁶ Finscope Report 2013

⁸⁷ In 2000 there were 129 bank branches in Uganda, and looking at the present this network has grown to over 629⁸⁷ branches nationwide- a fivefold increase- and with an ever increasing number of branches –about 371⁸⁷ as at 2014-being established in distant countryside areas, bringing financial services closer and more accessible to the rural based agri-business entrepreneur

the rural based agri-business entrepreneur⁸⁸. In twelve years from 2000 up to 2012, bank lending to the private sector had risen fivefold in real terms⁸⁹. (ii) In addition, since 2000, the Industry has *dramatically increased its intermediation of funds*- the extent to which banks convert their deposits into loans⁹⁰. Simply put banks have grown their footprint enormously to create financial inclusion for more Ugandans, and at the same time become more efficient in the way they convert their held deposits into loans for the private sector to access.

Despite this growth to date, the banking sector remains quite small, with for instance only one branch for every 53,000 Ugandans compared to an average of 7,000⁹¹ for the Common Market for East and Southern Africa (COMESA). Additionally most bank lending is extended to the non-traded goods sectors, especially trade, construction, telecommunications and to the household sector. The traded goods sectors of the economy, such as agriculture and manufacturing receive only 25% of total bank credit. This is a key limitation of the financial system as these least served sectors are indeed the principal drivers of economic development over the long term⁹².

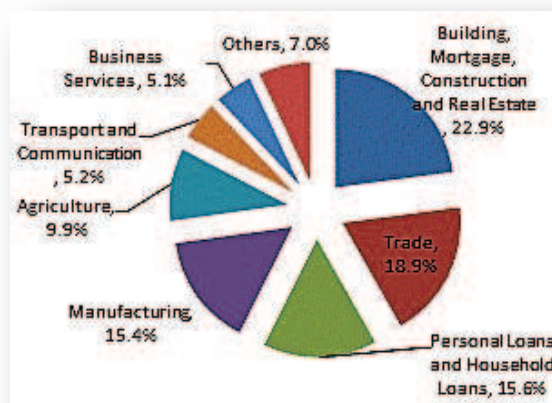


Figure 9: Allocation of bank lending by economic sector

5.2.1.1 Bank Lending to Agriculture:

Banks are the biggest contributors to agricultural lending, accounting for up to 95% of total amounts lent out for agriculture over recent years⁹³.

Agriculture which accounts for 24% of economic activity, still unfortunately attracts only 10% total bank lending. This however reflects significant growth achieved over the past several years; from a level of about 121 billion shillings in 2007 to present level of 1 trillion shillings as at May 2015.

Agricultural lending is fairly evenly distributed 38% and 37% to the primary production and processing activities respectively.

⁸⁸ There are about 0.3 commercial bank branches serving every 10,000 adult Ugandans. This indicator compares favourably across East Africa- though lower than Rwanda(0.8) and Kenya (0.6), but higher than Tanzania (0.2). The average for Africa as at 2009 stood at 0.8 branches per 10,000 people.

⁸⁹ Louis Kasekende, Deputy Governor of Bank of Uganda: Uganda's financial sector at 50-achievements, challenges and expectations of the future, 2013.

⁹⁰ By 2000, the commercial bank credit to the private sector was only 6% of GDP and banks lent out only 54% of their deposit base to the private sector. By 2012, 80% of the banks deposit base had been lent out to the private sector

⁹¹ Cited from 2003 report 'Financing SME's the experience of Uganda' Updated average more likely to be even lower

⁹² *A developing economy can often generate rapid spurts of economic growth over the short term based on investment in services and construction, but long term growth and structural transformation is almost always led by the manufacturing based export sectors*" cited by : Dr. Louis Kasekende, Deputy Governor Bank of Uganda

⁹³ Microfinance Deposit taking institutions account for 4% and Credit Institutions 1%

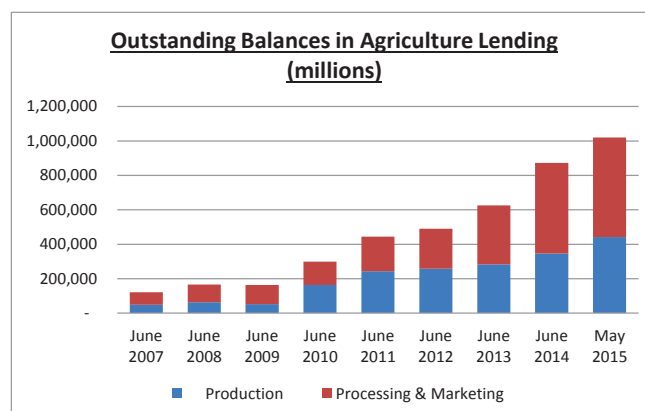


Figure 10: Growth of Agricultural Lending in Uganda. (BOU 2015)

The key factors that can be attributed to this impressive growth in agricultural financing include (i) public sector backed guarantees and technical assistance to banks that reduced “perceived” risks to investing in agriculture, leading to strengthened capabilities and confidence by banks to engage further in agricultural lending⁹⁴ (ii) Increased number of banks since the lifting of the moratorium on banks in 2007, catalyzing more funding available for agriculture (iii) the emergence of farmer friendly products like the Warehouse receipt system- against which farmers and traders were able to access credit on strength of their produce held under collateral management, and (iv) the deliberate effort by government – through the Bank of Uganda’s Agricultural Credit Facility- to provide specific incentives and finances for agribusiness (described further below).

5.2.1.1.1 Bank related Agri-Machinery financing products

Asset Lease financing is the most important source of asset financing available in Uganda. The advantages of lease financing are particularly well suited to a developing economy as Uganda’s. These include (i) *Accessibility*: leasing allows new businesses with limited capital and credit history or small businesses without a history of financial statements to quickly boost their operations as long as cash flow from operations is sufficient to cover the lease service payments. This is particularly relevant to significant number of SME’s in Uganda that are on the path to formalization. (ii) *Security*: Since lessors own the assets and use the asset as the primary security, SME’s can still be eligible for the lease financing when the bank loans would not be available due to lack of alternative collateral (iii) *Duration*: SME’s often have difficulty in accessing long term financing (over one year). Leases can provide longer duration financing, enabling SME to finance lease over a portion of the useful life of the asset (iv) *Payment terms*: Lease payments can be structured to mirror individual cash flow patterns of the lessee in contrast to bank loans which follow standardized repayment schedules (v) *Process time*: As the asset is its own security, less analysis is required of the customer’s credit worthiness, assets or capital base, and simpler documentation can be used – although this can be countered by the time it takes to acquire the assets usually from foreign vendors. (vi) *Technology transfer & Productivity*: it finances the import of more advanced and efficient equipment.

Despite the clear role lease financing can play in accelerating mechanization in Uganda it only accounted for a mere 2% of total Bank lending in 2012 versus 3% in 2011⁹⁵, a trend that has since reversed

⁹⁴ NGO’s: Alliance for a Green Revolution in Africa (AGRA) and Kilimo Trust provided loss loan guarantees to Stanbic bank that enabled stanbic to avail loans that supported primary production, post-harvest handling, storage, processing transportation and trade in agricultural inputs and produce.

⁹⁵ Agricultural Finance Year book 2012

significantly and positively upwards. The table below illustrates much improved levels of lease financing by the major banks in Uganda.

Table 11: Analysis of Lease Financing by Major Banks in Uganda

	Stanbic Bank		DFCU		CRDB	
	2014	2013	2014	2013	2014	2013
Finance Leases	140,630	93,658	45,765	47,355	21,564	17,709
Total Loan Book	1,618,380	1,415,041	681,199	624,462	850,721	680,026
Lease as % of Total Lending	9%	7%	7%	8%	3%	3%

Source: Authors analysis from 2014 Bank Financial Accounts.

An example of a lease product from the Centenary Rural Development Bank (CRDB) is analyzed below.

CRDB's Centelease product: The “Centelease” is a short to medium term lease product targeted at Individuals and Organizations actively engaged in agricultural production and small scale processing and manufacturing among other economic activities. The bank will lease assets and equipment in exchange of payments of periodic rentals for a period up to a maximum of 5 years, with the customer taking ownership at the end of all agreed payments. Customers can acquire assets of their choice with values ranging from Uganda shillings 100,000 (\$50) to a maximum of Uganda shillings 1 Billion (VAT tax inclusive). The types of agri-machinery that have previously been transacted under the Centelease include animal traction packages (ox-carts, ploughs, planters, oxen and yokes), ground nut shelling and grinding machines, coffee pulping machines, tractors, motor-cycles for produce transportation, hand operated oil extracting machines, motor driven milling machines, coffee hullers, rice mills, milk coolers, transportation equipment like milk tankers, refrigerated trucks, pick-up trucks, and rural energy equipment like windmills and solar lighting and refrigeration systems, among others

The Basic Requirements to access the Centelease product include, (i) Opening a bank account with CRDB, (ii) A cash contribution for the machinery purchase, (iii) payment of an application fee starting at Uganda shillings 50,000 (iv) A valid identification and (v) for the applicant to lodge his application at a branch close to his area of operation. Also require are (vi) relevant business experience, (vii) good loan history and (viii) for applicant to be aged 18 years and above.

5.2.1.1.2 Agricultural Credit Facility

The ACF was set up by the government of Uganda in partnership with Commercial Banks, and other financial institutions⁹⁶.

The aim of the ACF is to commercialize agriculture through the provision of medium to long term financing for the projects engaged in Agriculture, Agro-processing, modernization and mechanization. As such AFC financing is provided on terms far more favourable than are usually available from commercial finance sources. The scheme is administered by the Bank of Uganda (BoU), and is operated on a refinance basis in that the participating financial institutions (PFI's) disburse the whole loan amount to the sub-borrower and applies to BoU for the 50% GoU contribution.

⁹⁶ Other institutions participating in the ACF include, Uganda Development Bank Ltd (UDBL), Micro Deposit Taking Institutions, and Credit Institutions

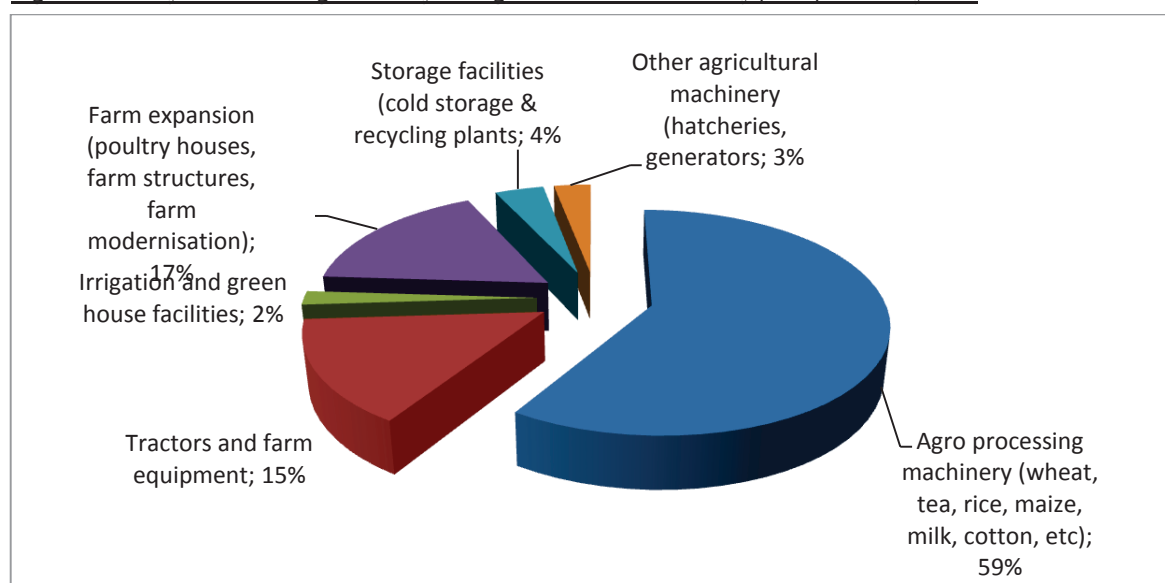
Eligibility: Private sector businesses or individuals operating in Uganda and engaged in agriculture and agro processing of raw materials and intermediate products originating from crop and livestock production, fish farming, poultry farming and breeding, among others.

Eligible Purposes include the acquisition of agriculture machinery and equipment and fixed assets for agro-processing, agricultural mechanization and modernization, postharvest handling equipment, storage facilities and other related agricultural and agro processing machinery and equipment. This scheme is not used for financing working capital for the trading in agricultural commodities, purchase of land, forestry and refinancing existing loan facilities.

Loan amounts: The maximum loan amounts to a single borrower is up to 2.1 billion (\$700,000), but can be increased up to 5 billion on a case by basis- for eligible projects that add significant value to the agricultural sector and the economy as a whole.

Interest rates: Initial interest rates at the commencement of the ACF were up to a maximum of 10% per annum to the final borrower, as the GoU contribution is disbursed at zero interest. The rate to the borrower has since been revised upwards to 12.5% per annum. Even with this increase, the ACF facility remains far more attractive than any other form of mainstream or asset financing available in Uganda today.

Figure 11: Analysis of financing sectors by the Agricultural Credit Facility (ACF) as at May 2015



5.2.2 Other Sources of Supply for Agri-Machinery financing

5.2.2.1 Microfinance Support Centre Ltd (MSC)

The MSC is a Government owned company incorporated in 2001, under the Ministry of Finance, Planning and Economic Development is mandated to provide affordable Micro Credit and Business Development Services to Cooperatives, Microfinance Institutions and Small & Medium Enterprises. In line with this mandate, the MSC is able to offer competitive loans for the acquisition of agri-machinery at the following terms:

- Interest rate of 9% per annum to microfinance institutions and 13%⁹⁷ per annum to SMEs.
- Interest is calculated on declining balance.
- Loan period not exceeding 4 years.
- Grace period of 6 months on principal.
- Monthly, quarterly or seasonal payments.

5.2.2.2 Micro Finance Lending

It is particularly pertinent that MFI's are increasingly recognizing and innovating financial products to meet the real needs of customers. Part of this innovation is resulting into the development of asset finance loans developed to suit the specific needs of the small MFI client. Through these products MSME's are who would otherwise not qualify for or have easy access Bank lending are accessing loans and procuring agri-machinery. This is particularly important since the Ugandan processing sector is predominantly MSME driven, for whom MFI's are a key source of financing.

5.2.2.3 Impact Investment

In terms of access to credit, there has also been the more recent entry of **Venture capital and Impact Investment funds**, and therefore the introduction of new more flexible forms of financing. Venture capital typically involves the provision of mid to long term investment finance to SMEs in the form of debt, equity or quasi equity instruments not traded on a recognized stock exchange. This mode of financing is particularly relevant for startup SME's that cannot satisfy the stringent bank requirements. Impact financing is particularly targeted at the so called 'missing middle'- SME's that typically find it hard to meet the criteria for commercial bank financing and yet are considered too big for Microfinance lending.

Often, Venture capital Funds are however looking for already successful companies, in high growth markets, with sizeable investment needs. There are presently about 13 Venture and Impact Investment firms operating in Uganda. Only 3⁹⁸ of these funds offer finance at amounts less than \$100,000⁹⁹. Perhaps, this type of financing is inadequately suited for agri-machinery market space in Uganda.

Generally, it is observed that the increasing confidence by financial institutions in agricultural lending bodes well for the future agribusiness initiatives.

⁹⁷ This rate is quite competitive in comparison to the prevailing commercial bank interest rates at about 18-24%

⁹⁸ Mango Fund, Yunus Business Fund and Root Capital

⁹⁹ Mapping the Impact Investment Space in Uganda, BSpace 2015

6 Conclusion

Uganda aspires to transform from a peasant country to a modern and prosperous upper middle income country with a per capita income of \$9,500, (Vision 2040). A lot of what will be required to achieve this bold aspiration is in place, including naturally gifted fertile soils and a good farming climate. Unlocking the potential that lies untapped will require serious efforts to mechanize farming, and transform the capacity at manufacturing, through quality value adding machinery.

The foundations that create strong demand for trade in agri-machinery are in place. There is a good enabling environment, supportive policy frameworks, and a growing local and regional market base, improving prospects in the financing of agriculture and agri-machinery in particular and perhaps most importantly, an increasingly eager and hungry market for value adding technology.

As a result of this agri-machinery scan, the following opportunities are selected as having the highest trade opportunities. They are equally determined to provide competitive advantage for the Dutch importer.

		Agri Machinery Opportunity	Rating
1	Dairy	Processing machinery of Mini Dairies	High
2	Dairy	Milk Cooling tanks and centres (MCC's)	High
3	Land Cultivation	Tractors	High
4	Poultry	Battery Cage	High
5	Poultry	Hatcheries	Medium
6	Dairy	Dairy-Dispensing Machines	Medium
7	Dairy	Dairy-Milking Machinery	Medium
8	Horticulture	Greenhouse for Vegetable	Medium

Dutch traders are invited to explore the following well selected trade opportunities, with further in-depth analysis, and a field visit to Uganda.

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