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VALUE CHAIN PRIORITIZATION FOR USAID-FUNDED LIVELIHOODS AND ENTERPRISES FOR AGRICULTURAL DEVELOPMENT (LEAD) UGANDA PROJECT

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By

Michael A. Ugen

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ACRONYMS AND ABBREVIATIONS

AU	African Union
BUGADEV	Buganda Agricultural Development
CAADP	Comprehensive Africa Agriculture Development Program
CBOs	Community-based Organizations
CDO	Cotton Development Authority
CIP	International Potato Centre
COREC	Coffee Research Centre
CSO	Civil Society Organization
CWD	Coffee Wilt Disease
DDA	Dairy Development Authority
DRC	Democratic Republic of Congo
DRIS	Dodo Rice Irrigation Scheme
EU	European Union
FAO	Food and Agriculture Organization
FICA	Farm Input Care Centre
GDP	Gross Domestic Product
GoU	Government of Uganda
HORTEXA	Horticultural Exporters Association
IARS	International Agricultural Research System
IDEA	Investment in Developing Export Agriculture
IDP	Internally Displaced People
IEHA	Initiative to End Hunger in Africa
IITA	International Institute for Tropical Agriculture
IRRI	International Rice Research Institute
JICA	Japan International Cooperation Agency
LEAD	Livelihoods and Enterprises for Agricultural Development
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MAK	Makerere University
MDG	Millennium Development Goals
MoFPED	Ministry of Finance, Planning and Economic Development
MT	Metric Tons
NAADS	National Agricultural Advisory Services
NaFiRRI	National Fisheries Resources Research Institute
NaLRRI	National Livestock Resources Research Institute
NARO	National Agricultural Research Organization
NARS	National Agricultural Research System
NaSARRI	National Semi Arid Resources Research Institute
NASECO	Nalweyo Seed Company
NBL	Nile Breweries Limited
NERICA	New Rice for Africa
NGOs	Non-governmental Organizations
NEPAD	New Partnership for Africa's Development
NRDS	National Rice Development Strategy
NSCS	National Seed Certification Service

OFSP	Orange Flesh Sweet Potato
OPV	Open Pollinated Variety
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
PPP	Private Public Partnership
PRDP	Peace, Recovery and Development Plans
QPM	Quality Protein Maize
RDS	Rural Development Strategy
RFTOP	Request for Task Order Proposal
SAP	Structural Adjustment Programs
SG 2000	Sasakawa Global 2000
UBoS	Uganda Bureau of Statistics
UBL	Uganda Breweries Limited
UCDA	Uganda Coffee Development Authority
UEPB	Uganda Export Promotion Board
UGTL	Uganda Grain Traders Limited
UNRDS	Uganda National Rice Development Strategy
UOSPA	Uganda Oil Seed Producers' and Processor's Association
USTA	Uganda Seed Trade Association
VC	Value Chain
VEDCO	Volunteer Efforts for Development Concerns
WARDA	West Africa Rice Development Authority (Africa Rice Centre)
ZARDI	Zonal Research and Development Institute

EXECUTIVE SUMMARY

Agriculture is the main stay of Uganda's economy contributing 42% of the GDP, over 85% of the export earnings and providing employment for over 80% of the population, 90% of them live in the rural sectors. The bulk of the agricultural output comes from about 4.5 million small-scale subsistence households 80% of who owns less than 2 ha of land. Agriculture here is predominately rain-fed, non-market oriented, and based on rudimentary technologies, and therefore, the high rate of poverty among the population. In order to have direct and immediate impact on poverty, there is need to improve agricultural productivity through increasing the effectiveness of service provision in the sector. LEAD's aim is to assist integrate farmers and related micro- and small to medium size enterprises into commodity value chains (VCs) so that they gain improved access to markets; more empowered relationships with suppliers, processors and traders thus ensuring sustainable livelihoods which will ensure an increase in food and economic security, and therefore, poverty reduction among the poor. LEAD, therefore, has to make decision on the use its available resources through supporting priority commodities most likely to result into value for money impact.

Therefore, this study was undertaken to make one coherent synthesis of the selected value chains, prioritize them and validate the LEAD VC approach which has been clearly shown in this report. The methodological approach to the study involved collection of information from various actors involved in the selected commodity value chains namely staple crops (maize, upland rice, sorghum, millet, barley, cassava, sweet potato, sunflower, sesame, common beans, groundnuts and soybeans), coffee, cotton, aquaculture, livestock and horticulture. Information previously collected in LEAD proposal development was also reviewed to ensure that conclusion and analysis were sound. The 14 given set of criteria (market potential, impact on food security and incomes, increasing value and volume, value addition and premium price capture, private sector/producer linkages, leveraging private/public sector investment, integrating producers in VC, participation of wider beneficiaries, highest use of productive resources, potential for bankability, overall importance in Uganda's agricultural economy and confluence with GOU development goals/CAADP/IEHA) in the RFTOP were used for the analysis and ranking of each commodity. Each commodity was scored against the criteria on a scale of 1-10. The ranking was based on a scale of 1 – 10 for each commodity where 1 = lowest possibility or potential and 10 highest possibility or potential. The commodity with the highest total score was ranked in position one while that with the lowest total score was ranked in the last position the summary of which is below.

Prioritization of the commodities

Using the set criteria, scores were made on each commodity against each criterion. Coffee had the highest total score of 110 or 78.6% and was ranked first among all commodities followed by livestock and cassava with total scores each of 109 or 77.9% in second position, maize in third position with total score of 107.5 or 76.8%, common beans in fourth position with total score of 106 or 75.7%, upland rice in firth position with total score of 104.5 or 74.6%, sweet potato in sixth position with total score of 103 or 73.6%, groundnuts in seventh position with total score of 94.5 or 67.5%, cotton eighth position with total score of 94 or 67.1%, soybeans in ninth position with total score of 93.5 or 66.8%, aquaculture in tenth position with total score of 92.5 or 66.1%, sesame in eleventh

position with total score of 92 or 65.7%, sorghum in twelfth position with total score of 90 or 64.3%, horticulture in thirteenth with total scores of 88.5 or 63.2%, millet in fourteenth position with total score of 75 or 53.6% and lastly barley with total score of 74.5 or 53.2%. The total score do not vary so much from commodity to commodity due to the fact that most of the commodities have unique niches which they occupy in the lives of the people producing them contributing the their improved welfare. The highly ranked commodities contribute more than the lower ranked commodities although producers will be happy to produce a little of each of the commodity. For the sake of commercialization and targeted farming, the ranking may greatly improve on production in terms of improved quality and quantity. This will help LEAD in decision making oh how beast to use the available resources at their disposal to maximally and positively impact on the lives of the many resource-constrained Ugandans involved in production of the commodities.

Staple Crops

The staple crops comprise of cereals (upland rice, maize, millet, sorghum and barley); oil crops (sunflower and sesame); pulses (common beans, groundnuts and soybeans); and root and tuber crops (cassava and sweet potatoes). These are the major food crops grown in Uganda. The market potential for maize and rice is high and medium for millet, sorghum and barley. For all the cereals, there is strong growing domestic demand and good regional markets. Pulses, oil crops and roots and tubers all have good domestic and regional markets with domestic market presenting a much greater opportunity for cassava than the regional markets. Consumption needs in the country is far more than supply and the situation is worsened by the border trade between Uganda and the neighboring countries. Millet remains important in the domestic markets while barley and sorghum are gaining importance in the brewing industries. All the staple crops are important food security crops except for barley and sunflower. They are major sources of income to many smallholder farmers in the rural areas. They are the major source of carbohydrates (cereals, roots and tubers), protein and amino acids (pulses and oil crops) and starch (roots and tubers) to many including various institutions. Production, processing and marketing of the staple crops involve many actors (producers, seed companies, processors, traders, exporters, food and feed manufacturers, NGOs, CBOs, NARO and NAADS) in the value chain including vulnerable groups with women and youth providing the bulk of the labor force. Cassava and sweet potatoes perform well across Uganda with relatively better production of cassava and orange flesh sweet potato (OFSP) northern and eastern Uganda. Beans and maize are grown widely in Uganda while millet, sorghum, soybeans, groundnuts and upland rice are better suited to northern and eastern Uganda. Barley is suitably grown in the eastern highlands of Uganda. Due to available land, good agro-ecologies and cheap labor in the north, there is room for expansion of staple crop production in the north except for barley. The use of high yielding varieties and good agronomic practices could increase value and volume while increasing utilization base (industrial use) and producing organically could attract investment and increase demand. Processing to various products and increasing utilization base could attract premium price and investment from private and public sectors. There are a lot of opportunities for private sector/producer linkages in the areas of technology development, seed production and marketing, processing, milling, manufacture of food and feeds and capacity development. Producers of staple crops are less likely to access financial assistance in form of credits compared to processors and exporters due to the unfavorable borrowing terms. Warehouse receipts and organizing farmers into

associations may improve access to finance. The staple crops remain key source food and nutrition security and household income. Most of them are becoming key non-traditional cash and export crops with very high demand in the domestic and export markets. Considering all the issues involved in the staple crops and the criteria used to score them, cassava scored highest (109) followed by maize (107.5), common beans (106), upland rice (104.5), sweet potato (103), groundnuts (94.5), sunflower (94), soybeans (93.5), sesame (92), sorghum (90), millet (75) and barley (74.5). The closeness indicates the importance producers attach to the commodities and how important others are compared to others as the 14 set criteria.

Coffee

Coffee is the most highly ranked (score of 110) compared to all other commodities. The long-term prospect for coffee industry in Uganda is good. There is high demand in the domestic, regional and international markets and the current market price is good. The Uganda Rubosta coffee receives the highest premium price worldwide. It is a leading foreign exchange earner in Uganda. Coffee has great potential impact on incomes and source of income for over 500,000 smallholder farmers. Due to cash income earned from coffee, it improves the purchasing power of producers, therefore improving on food security. Coffee is best suited for production in the south although Arabica coffee can perform well in the northern, eastern and western highlands. Adoption of CWD resistant varieties, pests and disease control management strategies and good post harvest handling and processing are likely to increase value and volume, and premium price capture. The potential for value addition into processed products is high as most Uganda coffee is exported raw. There are a number of areas where private sector producer linkages have highest potential in the coffee industry such as multiplication and distribution of seedlings, supply of agro-inputs, capacity building and processing and marketing. Although private sectors are participating in the coffee industry, their Investment currently is very low in the sector. There is need to avail high yielding disease resistant varieties couple with good prices to increase production and attract investors to invest in coffee. Coffee has very high potential to integrate a range of actors in the value chain including farmers, private sectors, women and youth, skilled and unskilled workforce and have generally well organized marketing structure. The south were coffee is important is also well serviced with utility services required for processing and export of coffee. Coffee currently has low to medium potential for bankability but this is expected to increase with improvement in value addition and processing, formation of cooperatives and the use of warehouse receipt system. Coffee has therefore, remained the highest national foreign exchange earner (66% earning from traditional crops and 19.9% from total earnings) and provides income to many smallholder farmers and over 1.5 million families involved in the value chain.

Cotton

Cotton is ranked eighth among all the commodities considered. Cotton has good market potential especially organic cotton although the current production is low due to low incentives to producers. There are opportunities existing in value addition, spinning, textile, oil and animal feeds and the local industries for manufacture of a range of products but currently no advantage is taken of these opportunities. Cotton does

contribute directly to food security but to income security and empowers farmers' capacity to improve on their food security situations. It is a source of cash to smallholder farmers and is estimated over 300,000 low-income households are involved in its production. Cotton performs well in northern and part of eastern Uganda. Availability of land resources, suitability in rotation with cereals and suitable agro-ecologies makes the north more advantageous in cotton production. The use of good varieties and improved agronomic practices and agro-inputs can result in increased value and volume while increasing organic cotton production, ginning capacity, processing to yarn and production of oil and animal feed can attract premium price and industrial use. Producers, private and public sectors and the vulnerable groups including women and youth are all involved in cotton value chain. Although organic cotton fetches premium price on the international markets, the proceedings do not equally trickle down to the producers. Usually the price offer to producers in a disincentive to production of cotton. Cotton still remains one of the important traditional export crops providing income to many smallholder farmers with potential for value addition and processing but with declining trend in production. There is need for new improved varieties and management practices for production of organic cotton as well as conventional cotton.

Fish (Aquaculture)

Aquaculture is ranked tenth among all the commodities. The fish industry in Uganda has very good long-term market prospect with increasing demands in the domestic, regional and international markets. The EU and US markets are rapidly growing estimated at 3,614 tons valued at US $ 143.62 million. Fish is an excellent source of protein for most households. The increased fish export has resulted into reduced fish available for domestic consumption as fish price sours up. This gives an opportunity to explore fish farming (aquaculture) to bridge the domestic demand but aquaculture production has over the years remained at subsistence level. Fish impacts greatly on income and affects over 700,000 persons directly and over 1 million indirectly in the fish sector. Fisheries still remains the second largest foreign exchange earner providing income to many smallholder farmers and other actors along the value chain and contributes 2.2% to total GDP. Fisheries resources are widely distributed in Uganda although the north has fairly good agro-ecological conditions for aquaculture farming. There is need to improve fish handling, preservation, processing, storage and transportation in order to increase access to higher value markets. Premium price can be captured in the fish industry through value addition (processing fish into various products) and linking fish feed producers to other crop value chain. A number of private sectors are involved in the fish industry and seek additional suppliers but fish quality still remains a big challenge. Therefore, the potential to include the private sector and other beneficiaries including vulnerable groups in the value chain is high but there is need for investments in infrastructure services to improve quality. On the other hand, aquaculture farming has great potential but the industry is at the infant stage. As demand for fish in the domestic, regional and international markets increases, there is need to address aquaculture farming as a business and improve expertise in fish farming so that the domestic market demand is met by aquaculture fish farming. Aquaculture is ranked low due to a number of reasons including lack of expertise in fish farming, still at infant stage, lack of involvement of the private sector in fish farming, quality control issue in terms of preservation and transportation. Otherwise with depletion of fisheries capture, aquaculture remains the potential to bridge the gap.

Livestock

Livestock is ranked as the second most important commodity after coffee and of equal importance with cassava. Market opportunities exist in the domestic and export markets for livestock and livestock products. The livestock sector contributes 17% of the national agricultural GDP in terms of milk and meat. It is a good source of animal protein yet the current per capita consumption of meat and milk is far below the recommended FAO level. Livestock provide direct cash income for many smallholder farmers. There is high demand for livestock products (milk, dairy products, meat, meat products, hides and skins) in the domestic and regional markets. Although livestock production is currently more organized in the south, the potential for increasing livestock production in the north is great. The north can take advantage of producing dual purpose breeds which can also help as animal traction (increased food crop production and transportation). The good agro-ecology and increasing population in the northern towns gives the north the potential to invest in livestock production couples with existence of markets in DRC, Kenya, Rwanda and southern Sudan and the need to extend land acreage under production using animal traction. Therefore, there is need to develop and disseminate appropriate technologies to increase market-oriented production. The use of improved breeds and feed resource management technologies to increase milk and meat will result in increased value and volume. Large opportunities still exist in value addition to dairy and meat products, leather processing and integration of livestock value chain with crop value chain (feed manufacture) for increased premium price capture. Private sector/producer linkages are possible in areas of agro-inputs and service supply, milk collection and processing, transportation, and manufacture of implements and animal feeds. Potential for integration of producers and a range of beneficiaries including vulnerable groups is high and the north would greatly benefit from livestock production. Being capital asset, livestock farmers access financial resources more easily than crop farmers. Livestock remains one of the most rapidly developing sector in Uganda and very important in Uganda's agricultural economy.

Horticulture and Spices

Horticulture is ranked thirteenth among the selected commodities. Long term prospects for horticultural market potential expansion is good. There are available domestic and regional markets for fruits and vegetables although quality still remains a big challenge for the high priced markets. Vegetables and fruits are source of daily income to smallholder farmers in most rural markets of Uganda. They are important nutritionally and early maturing (vegetables) resulting in quick return to investment. Their productions are dominated by women. The changing food habits in the towns demand for more consumption of fruits and vegetables. The availability of domestic and regional markets attracts increased production of fruits and vegetables especially in northern Uganda. Due to the shorter growth period for the vegetables, this would be a good starting crop for resettling IDPs in terms of nutrition especially the children and pregnant mothers and source of income. Although a number of actors are involved in the value chain, quality has been the challenge in production of fruits and vegetables. There is urgent need for quality improvement through varietal improvement, post harvest handling, capacity building and processing to attract good markets and capture premium price. Horticultural industry in the north is still not well developed compared to the south but has potential

to improve. There is need for investment in the horticulture industry for increased quality and quantity and consistent supply over a longer time period. Due to quality issues, most of the temperate fruits, the juices, canned fruits and vegetables and some of the tropical fruits are imported from other countries. Most of the locally grown fruits and vegetables are consumed locally yet the potential to market is there if quality can be improved.

Recommendations

The following are conclusions and recommendations that have emerged out the synthesis of the report:

(a) The highest ranked commodity was coffee followed by maize, common beans, upland rice, sweet potato, groundnuts, cotton, soybeans, aquaculture, sesame, sorghum, horticulture, millet and lastly barley. The variation in the total scores are not much mostly affected by market potential; food security being high for all except soybeans, barley, sunflower, coffee and cotton; impact on income being high for all except millet and barley; use of productive resources in project areas low to medium for cotton, millet, sorghum and barley; bankability being low for all except for livestock, coffee, cotton and sunflower. Increasing value and volume had high potential for all except millet, barley, sunflower and sesame. Integration of producers and participation of a wider range of beneficiaries had very high potential for all commodities.

(b) Although the commodities have been ranked and their positions noted relative to one another, some of the VCs ranked low may also have impact on the livelihoods of the small targeted communities producing them which should also be looked at when allocating resources. It is true the highly ranked commodities may have much wider impact on the communities producing them and should be given more priorities but even the low ranked ones should be considered for support.

(c) Many actors in the value chains especially the producers lack expertise essentially required in production and marketing of the commodities (a case in point is fish farming but equally applies to all commodities);

(d) Encourage the use and adoption of improved high yielding crop varieties and animal breeds; and improved crop, livestock/feed and fish management practices;

(e) Need to build sustainable seed supply system that will deliver high quality seed and meet the market requirements through support to formal and informal seed sector and NSCS

(f) Post harvest challenges including storage and transportation should be considered as they most affect quality of products especially milk, meat, and fish products and also the crops (aflatoxin issues, pests, etc);

(g) Increasing utilization base and processing of most of the crops will attract investors into the value chains;

(h) Encourage linkages between the commodity value chains for better synergy;

(i) Support should also be given to development of sustainable linkages among the actors within a value chain and encourage wider participation of many beneficiaries;

1.0 INTRODUCTION

1.1 Background

Agriculture is the main stay of Uganda's economy, contributing 42% of GDP, over 85% of export earnings, and providing employment for over 80% of the population, 90% of them live in the rural areas. Food crop production is predominant in the sector, contributing approximately 50% of agricultural GDP in 2002/03, while cash crops, livestock, fisheries and forestry provided 17, 16, 12 and 14 % respectively. The bulk of agricultural output comes from about 4.5 million small-scale subsistence households, 80% of whom, in average, each owns about 2 ha of land and produces a number of different food and cash crops besides herding some livestock (UBoS, 2004). Agricultural production is still predominantly rain-fed, non-market oriented, and based on rudimentary technologies and environmentally unsound practices. Resultantly, the country's agricultural products are often of low volumes, poor quality and are costly to assemble for sustainable market supply. In addition, the farmers are not organized in accessing inputs and marketing their produce efficiently, thereby incurring high production and marketing costs that affect the profitability of their enterprises.

Due to the civil war that has rocked Northern and Eastern Uganda for more than two decades, the region has remained behind in development. As more than 90 percent of the active labor force is involved in agriculture, and given that land is not a limiting factor for production in this region, agriculture can play a central role in reducing poverty. While it is good to introduce and promote use of improved technologies to increase agricultural production, making access to markets easier and enhancing the commercialization of local production may help even more. In areas where agriculture is mainly oriented at the household level, and where middlemen are active, they can play an important role in linking smallholders to the market. Farmers, however, need to be empowered with market information and with the necessary skills for group commercialization in order to succeed. At the initial stages, both the government and NGOs can play an active role, but both need to withdraw gradually so as to make farmers market on their own.

1.2 Poverty in Uganda

Income poverty fell drastically during the 1990s; the proportion of the population with expenditures below poverty line declined from 56% in 1992 to 44% in 1997/98 and 34% in 1999/2000 (MAAIF, 2006). However, the proportion of the population categorized as poor increased to 38% in 2002/03 while inequality, as measured by the Gini coefficient, rose markedly from 0.39 to 0.43 over the same period. An estimated 8.9 million people are now classified as "poor".

Overall poverty levels are highest in the northern region (64% of its population), followed by eastern region (46%), western region (31%) and central region (22%). Thirty seven percent of the country's populations categorized as "poor" are located in the northern region, 25% in eastern region, 21% in western region and 17% in central region. Poverty is largely a rural phenomenon, with 96% of the country's poor living in

the country side and 42% of the rural population live below the absolute poverty line compared to 12% of the urban dwellers (UBoS, 2003). Women make up the majority of the rural poor while female-headed households are poorer than male headed households. The largest group of households classified as being poor has consistently been those engaged in agriculture due to fall in world price of agricultural produce. Apart from the decline in crop producer prices, several other factors have contributed to the recent increase in poverty including slower growth in agricultural output, insecurity in some parts of the country, the north in particular, and the continuing rapid increase in population (MoFPED, 2004).

In order to have direct and immediate impact on poverty, there is need to improve agricultural productivity through increasing the effectiveness of service provision in the sector. LEAD's aim is to assist integrate farmers and related micro- and small to medium size enterprises into commodity value chains (VCs) so that they gain improved access to markets; and have more empowered relationships with suppliers, processors and traders thus ensuring sustainable livelihoods which will ensure an increase in food and economic security, and therefore, poverty reduction among the poor. In order for LEAD to effectively contribute to poverty reduction in Uganda, its activities will fall under three result areas namely increased productivity, increased trade capacity, and enhanced competitiveness within selected value chains. LEAD will catalyze the transformation of Uganda's rural sector from one which is largely characterized by subsistence farming to a commercial status, with emphasis on "farming-as-a-business" which is what Plan for Modernization of Agriculture (PMA) policy in Uganda seeks to accomplish. LEAD envisages injecting approximately 60% of the project resources in the north (the region more effected by poverty as a result of civil strife) by working closely with a combination of private/public sector partnerships including international and local NGOs, government institutions, who have long established relationships with current and former internally displaced peoples (IDPs) and other vulnerable populations, and who promote livelihood development and related support services. The remaining 40% of LEAD resources will be strategically utilized in the south. LEAD's strategy will involve working with producers organizations (Pos) in specific VCs to achieve its goals and objectives.

LEAD intends to work with a number of VCs as mentioned in the Request for Task Order Proposal (RFTOP) including commodities such as staple crops {cereals (upland rice, maize, millet, sorghum and barley); root and tuber crops (cassava and sweet potatoes); pulses (common beans, groundnuts and soybeans); oil crops (sesame and sunflower); coffee; cotton; aquaculture; livestock; and horticulture. The resources available to LEAD over the five year period may not efficiently and effectively cover all aspects of the named VCs. There is need for LEAD to prioritize the named commodities using some set criteria as proposed in the RFTOP in order to effectively and efficiently utilize the available resources at LEAD's disposal on VCs where the greatest positive impact (economic benefits) on the livelihoods of the affected communities both in the north and south is expected to be highest. This is why the prioritization of the named VCs has been undertaken by LEAD to help improve on project implementation and allocation of available resources.

1.3 Purpose and objective of value chain prioritization

The Value Chain (VC) assessment is a tool which will be used by LEAD to prioritize commodities so as to make best use of project resources. ARD. Inc. undertook a VC assessment as part of its pre-proposal work looking at the major VCs mention in the Request for Task Order Proposal (RFTOP). This current assessment will take that information already provided by LEAD and use that to construct one coherent, integrated document that summarizes the results in both narrative and matrix form and also give scores to the VCs against set criteria. This we hope will help to validate the LEAD VC approach as currently underway, and help with program management in the initial sequencing of project interventions (allocation of resources to the various VCs and proper implementation of the project).

1.4 Methodological Approaches to the study

The study involved consultations with various stakeholders to collect information for the value chain prioritization for selected commodities namely staple crops {cereals (upland rice, maize, millet, sorghum and barley); roots and tuber crops (cassava and sweet potatoes); pulses (common beans, groundnuts and soybeans); oil crops (sesame and sunflower); coffee; cotton; aquaculture; livestock; and horticulture. Information previously gathered from various stakeholders in LEAD proposal development were reviewed by the consultant and compared with the VC analysis matrix developed earlier on in the LEAD project implementation to ensure that the analyses and conclusions were sound and based on facts. The consultant had a number of informal discussions with various stakeholders involved in the staple crops, coffee, aquaculture, and horticulture and cotton value chains to verify the original findings and also get more in-depth information on the various value chains. The consultant also worked with the various stakeholders to give scores to the various VCs against the set criteria on a scale of 1-10 (where 1 is low possibility or opportunity and 10 is highest possibility of opportunity). Total scores for each VC was added and weighed against other VCs within the same category as for staple crops (cereals, roots and tubers, pulses and oil crops) and against other commodity VCs. Total score and percent scores were used for the reporting.

Some of the stakeholders interviewed by the consultant included members of Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), extension agents at district and sub-county levels, national and international research scientists, and scientists from Makerere University, seed companies, and companies involved in provision of inputs (agro-input dealers) for production, processing and marketing of the products of interest and some donors and non-governmental organization/community-based organizations. For the above named commodities, the consultant used the below set criteria for the detail analysis and scoring of each commodity as provided in the terms of reference:

1. Market potential (short-, medium, and long-term as well as domestic, regional, and international);
2. Impact on food security;
3. Potential for impact on incomes;

4. Location-specific advantage;
5. Potential for increasing value and volume of marketed agricultural production from project areas;
6. Potential for value addition, premium price capture and industrial use;
7. Potential for private sector/producer linkages;
8. Potential for leveraging private and/or public sector investment;
9. Viability of integrating producers/farmer groups into value chains;
10. Potential for participation by a wide range of beneficiaries, including women and vulnerable groups;
11. Potential for highest use of productive resources in project areas;
12. Potential for "bankability" within a reasonable timeframe;
13. Overall importance in Uganda's agricultural economy; and
14. Confluence with Government of Uganda's development goals as outlined in the Peace, Recovery and Development Plan (PRDP), the Poverty Eradication Action Plan (PEAP), the Plan for Modernization of Agriculture (PMA) and other relevant objectives such as the Comprehensive Africa Agriculture Development Program (CAADP) and the Initiative to End Hunger in Africa (IEHA).

The consultant using the above set criteria is therefore, to develop a detail narrative report which syntheses the findings from the original CV analysis as well as verifies the current soundness of the data, give scores to each VC against the set 14 criteria (calculation of total scores for weighing against and also indicate areas where more in-depth analysis is required.

2.0 VALUE CHAIN PRIORITIZATION SYNTHESIS REPORT

This report is a presentation of the detail analysis, synthesis and scores of VCs for staple crops {cereals (upland rice, maize, millet, sorghum and barley)}, pulses (common beans, groundnuts and soybeans), oil crops (sesame and sunflower), coffee, cotton, livestock, aquaculture and horticulture the complete report summary of which is presented in Annex 1 and the score matrix summary in Annex 2. The VC scores have been compared among similar crops within a group (scores of crops within cereals, pulses, oil crops and roots and tubers were compared within each category and between categories). The rating and ranking of the commodities as considered in the RFTOP in ascending order is coffee (score 110 or 78.6%), livestock (109 or 77.9%), cassava(109 or 77.9%), maize (107.5 or 76.8%), common beans (106 or 75.7%), upland rice (104.5 or 74.6%), sweet potato (103 or 73.6%), groundnuts (94.5 or 67.5%), cotton (94 or 67.1%), soybeans (93.5 or 66.8%), aquaculture (92.5 or 66.1%), sesame (92 or 65.7%), sorghum (90 or 64.3%), horticulture (88.5 or 63.2%), millet (75 or 53.6%) and lastly barley (74.5 or 53.2%). Details of the description are as below.

2.1 STAPLE CROPS

The staple crops that were analyzed here in this report are as indicated in the RFTOP and they include cereals (upland rice, maize, millet, sorghum and barley), roots and tuber crops (cassava and sweet potatoes), pulses (common beans, groundnuts and soybeans), and oil crops (sesame and sunflower). The results of the analysis as reported below indicated in order of priority cassava to have had the highest score of 109 (77.9%) followed by maize score of 107.5 (76.8%), common beans score of 106 (75.7%), upland rice score of 104.5 (74.6%), sweet potato score of 103 (73.6%),

groundnuts score of 94.5 (67.5%), sunflower score of 94 (67.1%), soybeans score of 93.5 (66.8%), sesame score of 92 (65.7%), sorghum score of 90 (64.3%), millet score of 75 (53.6%) and barley came last among the staple crops with score of 74.5 (53.2) using the 14 set criteria. This means when staple crops are considered, priorities are given to the crops as per the ranking although differences among the crops in terms of ranking are small. It also shows how stakeholders value all the crops as important as all have unique contributions to make in their daily lives. Details of the scoring and reasons for the scores are given below.

2.1.1 CEREALS

Considering the cereals crops alone, the most highly ranked crop was maize (3rd overall position) followed by upland rice (5th position), sorghum (12th position), millet (14th position) and barley (15th position) in that order. The details are given below.

2.1.1.1 Upland Rice

Market potential – 8.5

Rice in Uganda is grown mainly by small scale farmers almost throughout the country with a few large scale farmers in some places. Total production in Uganda is estimated at 144,000 metric tones and total rice consumption is estimated at 204,000 metric tones. Population growth rate is 3.2% thus the demand for rice is expected to rise. Since the introduction of upland rice in 2002, rice farming has grown from a mere 4,000 farmers to nearly 60,000 farmers to date. From the earlier releases of three upland rice varieties in Uganda in 2002 courtesy of the Rockefeller support farmers were able to reap $9 million (14.9 billion) in 2005. The market potential for rice in short and medium term is very high in the domestic and regional markets (very good, very strong and growing) and this is expected to rise in the long term in the international markets. Rice price continues to rise locally, regionally and internationally and this is projected to continue for a while. Uganda has had the largest formal (US $ 93 million) and informal (US $ 4 million) import of rice annually but this is rapidly changing with introduction of upland rice in Uganda. Therefore, the market potential is very high (score 9.0)

Impact on food security – 6.5

Rice is important both in the rural and urban areas as a food security crop and staple for households and institutions. The Uganda National Rice Development strategy (NRDS) lays out Uganda's strategy for promotion of rice production between 2009/10 - 2017/18 with the aim of increasing household food security and reduce household poverty through increased production of high quality rice. These strategies will result in more than doubling rice production in Uganda from about 144,000 tons to an anticipated 302,250 tons in 2018. Therefore, rice remains a good food security crop for Uganda and demand continues to rice in the country. According to the FAO's rice price index, rice prices have skyrocketed by around 76% between December 2007 and April 2008. For prices to fall favorable weather conditions must prevail in the coming months and governments to relax rice export restrictions. The current production in Uganda is low to adequately meet food security need in Uganda compared to maize.

Potential for impact on incomes – 8.0

Demand for rice seed has skyrocketed in Uganda over the years which have been attributed to the high demand for rice in the country to the extent that every farmer is beginning to get interested in rice farming. The availability of high yielding varieties and high price offered for rice in the market are incentives to increase rice production. Uganda adopted NERICA 1, 4 and 10 varieties in addition to the old lowland varieties. Since the introduction of upland rice in 2002, rice farming has grown from 4,000 farmers to nearly 60,000 farmers. This number of farmers is expected to rise in the north especially with the resettlement of the internally displaced people (IDP) from their current camps to their original homes to allow them settle and implement better and more organized modern farming. From the earlier releases of three upland rice varieties in Uganda in 2002 courtesy of the Rockefeller support farmers were able to reap $9 million (14.9 billion Uganda Shillings) in 2005. In the process, the country has seen rice imports drop between 2005 and 2008. This trend of events according to the National Agricultural Research Organization (NARO) saved the country about $30 million (Uganda Shillings 50.4 billion) in foreign exchange earnings. Most Ugandans prefer Ugandan upland rice due to its good aroma (NERICA 1) and early maturity (NERICA 4 and 10) and domestically they fetch higher price than imported rice. Therefore, the potential for impact on income is very high

Location-specific advantage – 8.0

Uganda is advantaged by the bimodal type of rain as compared to other neighboring countries such as Tanzania, Kenya, Rwanda and Democratic Republic Congo (DRC). About 80% of rice farmers in Uganda are small scale farmers with acreage of less than 2 hectares. Most upland rice in Uganda is traditionally grown in eastern and northern Uganda with substantial production of recent in western Uganda due to the presence of lowland areas with high moisture content throughout the growing season. Rice in totality including paddy rice is produced more in eastern Uganda. Rice production is expected to increase in northern Uganda as vast areas of lowland areas are available with much more reliable rainfall and proximity to southern Sudan and DRC routes and markets. Harvesting in northern Uganda coincides with Christmas season when demand for rice is high and prices are high assuring farmers of better income. Government of Uganda intends to increase rice production to cater for the ever increasing demand.

Investing in northern Uganda where IDP communities are being resettled with plenty of available low-lying land areas, cheap labor, good growth conditions, available markets (domestic and regional markets) and use of better varieties and proper agronomic practices would boost production of rice in Uganda to meet the ever increasing demand domestic and regional demands. Therefore, very high location-specific advantage in northern and eastern Uganda in addition to western Uganda and now also central Uganda.

Potential for increasing value and volume of marketed agricultural production from project areas – 8.0

The potential for increasing value and volume of marketed rice product is very high. Total rice consumption is estimated at 204,000 metric tons yet total production is estimated at only 144,000 metric tons leaving a deficit of 60,000 metric tons. Consumption per capita is about 8 Kg. The total population of Uganda is about 30 million with annual growth rate of 3.2% (UBoS estimates) indicating that rice

consumption is likely to increase. Domestic rice production is increasing and local and regional demand is also increasing. Availability of high yielding rice varieties (NERICA varieties), available land especially in the north, use of good agronomic practices, high price for Ugandan rice and the high demand for rice in the East African countries (Rwanda, Kenya, Tanzania, Uganda and Burundi) coupled with interest of farmers to grow upland rice is most likely to increase the volume and value of marketed rice. East African import over 700,000 metric tons of rice per year yet Uganda is well placed to produce and export to the neighboring countries due to location specific advantage Uganda has. Rice production would therefore provide an import substitution of about $150 million worth of rice every year to Uganda if it is able to double its production. This covers for only 15% of rice imports in East Africa. There is need for LEAD to invest in breeder and foundation seed production, dissemination of improved varieties and agronomic practices in the north which is more advantaged while taking advantage of western Uganda in collaboration with other development partners.

Potential for value addition, premium price capture and industrial use – 7.5

The potential for value addition and premium price capture is high except the current post harvest handling practices by rice farmers are relatively poor. Although majority of farmers harvest rice when its moisture content is about 21 – 24% (wet basis) other subsequent operations are poor. Threshing is currently done mainly by beating the heaped rice on a tarpaulin, plastic sheeting or mat (68.9%). About 21.6% of the farmers thresh rice by beating it on bare ground. Such a practice usually leads to heavy contamination of the rice with stones and other foreign matter which significantly contribute to low quality of the milled rice and increased rate of wear and tear of mill parts. Use of improved threshers by farmers is very minimal. The current investment in the milling industry stands at US $ 2.3 million (since 2004 to date). Investments in milling will improve value and price while availability of aromatic rice (NERICA 1) earns premium price on the market. There are 8 new medium scale rice processors and 1 new large scale rice processor (above 20,000MT) with total milling capacity of 69,000 MT. The rice processors are owned by Tilda in eastern Uganda, Bugiri district (20,000 MT capacity); Sunrise Limited in Kampala (12,000 MT capacity); Upland Rice Millers in Jinja district (12,000 MT capacity); VP mill at Kakira, Jinja district (10,000 MT capacity); Rwenzori Upland Rice Fort Portal, Kabarole district (6,000 MT capacity); Kilimanjaro Limited at Natete, Kampala (5,000 MT capacity); and Ecomax Limited in Luwero (4,000 MT capacity).

There are 185 small scale mills imported between 2003 and 2008 (SB5, SB10 and SB30 Models) with a combined capacity of 74,000 MT. Hence there is more need to improve the post harvest handling of rice among the small scale farmers. There is high potential to improve on value addition and earn premium price with proper milling, use of aromatic varieties and diversification of utilization base of rice in the food industry.

Potential for private sector/producer linkages – 8.5

The potential for producer/private sector linkage is high for rice. Rice is an emerging priority crop in the Government of Uganda (GoU) strategies because of its potential to greatly reduce household hunger and poverty and increase income. Modernization of agriculture is a key element of the current government policy and rice interventions

are getting priority as one of the key crops for poverty and huger reduction. The government exemption of taxes for some agricultural development inputs and the existence of a Rice Industry Secretariat avails a platform for strengthening institutional linkages.

Currently, 14 seed companies have conducted marketing of rice in the country majority of which are operational to date. The companies include Farm Input Care (FICA) Seeds, Nalweyo Seed Company (NASECO), Victoria Seeds Company Limited, Harvest Farm Seed Company, Akuku Seed Company and the East African Seed Company. Other seed companies include OTIS Garden Seeds, Monsanto-Kenya, Mt Elgon Seed Company, Western Seed Company Limited, SEEDCO Seed Company, and Pannar Seed Company. The seed companies have gone regional, for example Farm Input Care (FICA) Seeds, Nalweyo Seed Company (NASECO), Victoria Seeds Company Limited, and OTIS Garden seed have marketed seed to Southern Sudan, Kenya, Rwanda and the eastern part of the Democratic Republic of Congo (DRC). The seed companies are all members of Uganda Seed Traders Association (USTA). The seed companies contract farmers/farmer groups (producers) to produce seeds for them which are then sold out to other producers for further grain production.

Other private sectors involved in linking with producers are the processors (Tilda, Sunrice Limited, VP Mill, Rwenzori Upland Rice Millers, Kilimanjaro Limited and Ecomax Limited) for milling of the rice from small scale producers; NGOs such as SG 2000 for promotion of the varieties; the transporters who transport from producers to the millers/processors and exporters who purchase direct from producers to export regionally such as AFROKAI limited in Kampala. The producers also feed the millers with grains and traders and exporters procure un-milled and milled grains for trading. LEAD should encourage and strengthen sustainable linkages between producers and private sectors and provide an easy path for entry.

Potential for leveraging private and/or public sector investment – 8.0

Rice production in Uganda started in 1942 mainly to feed the World War II soldiers, however due to a number of constraints, production remained minimal until 1974 when farmers appealed to the then government for assistance. In response, government identified the Doho swamps and constructed the Doho Rice Irrigation Scheme (DRIS) with the help of Chinese experts. Today rice is grown mainly by small scale farmers almost throughout the country, but also with large scale farmers in few places. Trading of rice in Uganda is completely under the private sector. Most of the trading is done by middle men who buy threshed rice from the farmers at the farm. The price of rice varies from place to place between UShs.1500= per kg to UShs. 2,500= per kg of locally produced rice. This rice is usually packed in 50 and 100 kg bags. Some medium and large scale processors however process, package and brand their rice thereby fetching higher market prices ranging from Uganda Shillings 2,500= to Uganda Shillings 7,500= per Kg. As noted earlier, the GoU effort in its national development strategy is to more than double rice production in Uganda and the GoU will also continue to invest in rice research through NARO (variety development and foundation and breeder seed production), advisory services through NAADS while seed companies will continue to invest in seed production and marketing. Other private sectors involved in value addition are food processors, millers and NGOs/CBOs.

Therefore, the potential to leverage private sector and or public sector investment is very high. A case in point is the Vice Presidents office actively getting involved in rice production promotion countrywide. LEAD should support and work closely with both the private and public sectors to leverage investments from both for increased rice production and generation of income and ensure food, nutrition and income security.

Viability of integrating producers/farmer groups into value chains – 7.5

Rice production in Uganda is mainly carried out by small scale farmers and some few large scale farmers. The small scale farmers are either individual farmers or farmer groups. Majority of the producers have noted the advantage of farming as groups in terms of milling which has resulted in formation of many farmer groups across rice growing areas. Producers are also involved in direct marketing of rice after milling. Due to the increasing population, market for rice have also increased, thus there is high demand and adoption of rice as a major enterprise for food security and for income. Therefore GoU and development partners are increasingly identifying rice as a strategic crop for poverty alleviation. Strategies for training Agricultural officers and farmers in rice production have been developed by MAAIF. There is need to support farmers and farmer groups to enhance their capacities to increase volume and value of rice. There is need for provision of market information to producers, organized group marketing for the products and reorienting the producers to high value markets as means of making producer integration in the VC more viable. In addition, there is need for organized credit facilities so that producers are able to afford necessary machineries for value addition and premium price capture.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 7.5

Globally Rice has been gathered, consumed, and cultivated by women and men for more than 10,000 years, longer than any other crop. Women play a major role in rice production in the country including field opening, planting, weeding, harvesting, bird scaring and other agronomic activities such as on farm processing and marketing. Sometimes due to gender imbalance, the proceeds from rice sales do not trickle down to the women who have labored in the production process. Youth are less involved in rice production but mostly used for scaring birds and this causes a danger to future production and food security. Most of the youth prefer to seek jobs in urban areas. The disabled are also involved in rice production through helping with scaring of birds. Other beneficiaries involved in rice value chain include NGOs, CBOs, processors/millers, seed companies, traders, food processors and consumers.

There is need for building coherent partnership among the value chain actors with properly defined roles and responsibilities for better sharing of benefits right from production through processing to marketing and consumption.

Potential for highest use of productive resources in project areas – 8.0

The northern region has a much higher potential for use of productive resources than the rest of the country because of the following reasons. First, the north has generally flat light sandy clay soil that is easy to open, a situation suitable for extensive rice production. It also has long dry season suitable for clean seed/grain production and proper grain filling. Second, the northern farmers are cereal crop farmers who have been growing rice for some time. It is therefore easy to increase rice production given required productive resources. Third, rice farming is an enterprise that has a short

gestation period. This is very good for the farmers in northern Uganda who are settling back home from the IDPs and making quick investments. Fourth, labor cost in northern Uganda is relatively cheap making rice production cost relatively low. Lastly, the area has relatively good communication network to DRC and Sudan and other parts of the country.
The rest of the country has two strategic advantages. First, there is high population which increases demand and makes rice marketing competitive. Second, the region has good road network and better accessibility to other services such as electricity. These factors make rice value addition easy and therefore high potential for use of productive resources.

Potential for "bankability" within a reasonable timeframe – 2.5
Potential for bankability is low to medium. Producers are most likely to benefit less from financial institutions in terms of credit facilities but may benefit from warehouse receipts if the producers are organized into producer organizations. The current credit or financial institutions benefit traders and processors/millers more than producers due to the repayment scheduling. Widening the utilization base of rice may increase demand in the long run prompting the need for increased production, and therefore, need for financial support of credit access. But it should be noted that rice farming is an enterprise that has a short gestation period. This is very good for the farmers in northern Uganda who are currently being resettled to make quick return to their investments.

Overall importance in Uganda's agricultural economy – 6.0
Overall importance is at medium level with high potential in the long run. Rice is a food, nutrition and income security crop. Rice is increasingly becoming a non-traditional export crop in Uganda with increasing demand in the domestic and export arena. Hence the Government of Uganda intends to increase rice production to cater for the ever increasing demand. Uganda farmers were able to reap $9 million (14.9 billion Uganda Shillings) in 2005. In the process, the country has seen rice imports drop between 2005 and 2008. This trend of events saved the country about US $ 30 million (Uganda Shillings 50.4 billion) in foreign exchange earnings.

2.1.1.2 Maize

Market potential – 8.5
Uganda is the only country in the Eastern and Southern region with a more stable production and supply of maize production. Maize is the most important staple food crop in most countries in the region. Therefore, Uganda's domestic maize market (schools, military, police, prisons, hospitals, IPD, town dwellers and refugees) is strong and demand is growing. The regional market is good and dominated by cross border trade to DRC, Rwanda, Kenya and the Southern Sudan. There is always annual deficit of maize in Kenya which is always bridged by supply from Uganda. The potential maize export capacity in the region is increasing annually. Uganda is a major source of relief food for the World Food Program in the Central and East African region. This market accounted for about 150,000 MT of maize from 2002-

20007 and is expected to double to worth 500 million US Dollars in 2009. Earlier, in 2002, about 30,000 MT of maize, worth US$ 3.4 million was supplied to Zambia through Uganda Grain Traders Limited (UGTL). This was at a time when there was abundant production that depressed the farm gate prices. However, with the recent food crisis, price of maize has more than double and demand has increased. This means there is an increased market potential for farmers engaged in commercialized production of maize domestically and regionally. In fact, recently, there has been increased domestic demand of seed by commercial farmers in the country and those outside the country. Several stakeholders view the Kenyan and south Sudan markets as the best long-term market for Uganda's maize (100,000 – 150,000 MT), while the southern African market is bound to be intermittent.

Impact on food security – 8.5

Maize is the most important cereal crop in the country and increasingly gaining popularity as a major food security crop for many households alongside bananas, cassava and sweet potatoes. It has become a major part of the nutritional regime in the rural and urban communities as major source of carbohydrates and high quality protein. It is also a major staple food for institutions like schools, hospitals, prisons, military, internally displaced persons and refuges from neighboring countries.

Potential for impact on incomes – 7.5

Maize has become a non-traditional cash and export crop. It provides employment to traders, millers, exporters and transporters, making it an important crop for income-generation. The maize sub-sector is estimated to provide a living for approximately two million households, 1,000 traders/agents and over 600 mill operators. The other use that has been on increase is utilization of the crop as feeds for mainly chicken and pigs. Maize production can provide a pathway out of poverty through improvements to household nutrition (quality protein maize/QPM), cash income, asset building and employment and is, therefore, essential in the country where one third of the population lives under the poverty line of 1 US $ per day. In 2007, export value of maize amounted to US Dollars 23.8 million (FAO). Currently maize is farmed by over 400,000 producers. Therefore, potential for impact on incomes is high.

Location-specific advantage – 7.0

Maize is widely grown all over the country, with the climate favoring two crops annually in some of the major production regions, and a possibility of having three crops annually through use of irrigation. The amounts of rainfall received in most parts of the country exceed 1,100 mm suitable for maize production. In fact multi national seed companies such as Monsanto produce seed for the region in Uganda. This provides opportunity to supply the regional market where it is the most important staple food crop with per capita consumption of greater than 50 kg. Persistent unfavorable climate, frequent occurrence of drought, low levels of soil nutrition and unstable political conditions in a number of countries in the Eastern, Central and Southern Africa have also contributed to this increased demand for Uganda's maize. Maize is generally produced in both northern and southern Uganda with growing potential for increasing production in northern Uganda especially with

resettlement of the IDPs. High maize production is also in eastern Uganda and mid western Uganda.

Other advantages for expansion of maize production in northern Uganda includes availability of large junk of land to attract large scale producers or investors and commercial producers, reliable rainfall, favorable agro-ecological environment, fitting well in the farming system, fertile soils good for production of hybrids, cheap labor and reliable communication network to and availability of markets in southern Sudan and DRC.

Potential for increasing value and volume of marketed agricultural production from project areas – 8.0

Uganda's potential export capacity of maize in the region is estimated to be greater than 200,000 MT per annum. However, currently the level of penetration is quite low because only 50% of the potential is being exported. This is attributed to its being a staple food crop in the Eastern and Southern African countries. The introduction of hybrids with yield increase from 2 tones/ha for open pollinated varieties (OPV) to 7 – 9 tons/ha for hybrids is likely to increase volume of marketed products. Similarly shift from producing local OPV to improved OPV increased yield from 1-2 tons/ha to 5 tons/ha. The use of high yielding hybrids and improved OPV and improved agronomic practices are expected to increase marketed volume of maize. At the same time, the processing of maize into first class flour has opened opportunity for value addition improving on the value of marketed maize. Therefore, the potential for increasing value and volume of marketed maize is very high both in the north and south. There is need for LEAD to invest in breeder and foundation seed production and dissemination of improved production practices to end users in collaboration with other development partners.

Potential for value addition, premium price capture and industrial use – 7.5

The potential is high especially where their utilization base is linked to industrial use. In the feed industry because prices of maize grain went up beyond economic threshold, cassava has been adopted as substitute. This has impacted heavily on poultry farmers and poultry product consumers. Chicken is very scarce and in limited supply and if available, it is underweight and has poor quality due to lack of good quality feeds. Utilization of maize as feeds for poultry and pig production is expected to rebound if maize production in the country increases to meet the ever-increasing human consumption demands and domestic and regional markets. Milling of maize into first class flour has also improved on value making maize fetch premium price in the markets especially when sold to the neighboring countries of DRC, Rwanda and Southern Sudan. Maize also has potential for making a number of nutritious food products such as baby food, bread, etc. Maize is also used in production of alcohol which can be used for production of other materials apart from drinking. The other yet novel uses of maize are the proposed utilization for extraction of oil by Mukwano Industries and bio-fuel production by Spencon. This will increase demand for well-adapted maize varieties with high oil content. Therefore, diversification of maize utilization in the food and feed industries, bakery, breweries and extraction of oil would add value and attract premium price. Therefore, the potential is high.

Potential for private sector/producer linkages – 8.0

Maize is produced mostly by smallholder farmers on land areas less than 0.5 ha on average. Private sector is heavily engaged in maize seed and grain production, marketing and milling. Maize is the most important commodity for the seed companies in Uganda. Currently there are 14 registered small-medium scale seed companies in the country. These companies have contracted most of the maize seed production to individual farmers and farmer groups. On the grain side, the maize value chain is relatively long with several participants that include farmers/producers, traders (rural and urban traders or agents, large scale traders), commodity brokers/Uganda Commodity Exchange, grain millers, animal feed blenders, local brewers, NGOs/CBOs and consumers. The potential for private sector-producer linkages is very high and LEAD should provide support for long term interaction and strengthen linkages among participating actors in the maize value chain.

Potential for leveraging private and/or public sector investment – 8.0

Because there are many players along the maize value chain {farmers/producers; seed producers (FICA, Victoria seeds, East African Seeds, NASECO, Harvest Farm, etc); traders (rural and urban traders or agents, large scale traders); commodity brokers/Uganda Commodity Exchange; grain millers and food blenders (Maganjo and Kasawo grain millers); animal feed blenders (Ugachick, Bright Chick, Kenya Animal Feed, etc); local brewers; NGOs/CBOs; and consumers; public institutions such as NARO, Universities and NAADS}; there is opportunity for investment by the private and public sectors particularly in areas of value addition (milling, brewing, and feeds and food manufacturing) and technology development and dissemination. The GoU is heavily involved in technology development and dissemination through NARO, advisory activities through NAADS and policy issues through MAAIF. Seed companies have invested in seed production and marketing while food and feed manufacturers in value addition. Maize is now considered a crop of great strategic importance in the country to address issues of food security and household income. LEAD should act as a catalyst to encourage and support leverage of the private sector and public sector investments in the maize value chain.

Viability of integrating producers/farmer groups into value chains – 8.0

Many farmer groups exist in the country with knowledge in maize grain and seed production. The farmers predominantly carry out maize production on a subsistence level, though there are emerging commercial farmers who grow it on a medium to large scale. Small-scale farmers have land holdings of between 0.2 - 0.5 ha on average under maize production, while the emerging medium scales commercial farmers have 0.8-2.0 ha while the large scale farmers grow beyond 2 ha. Almost all the small-scale farmers do not use improved inputs and lack post harvest equipments. Nonetheless, small-scale farmers make up about 95% of households engaged in maize production and contribute over 75% of the marketable surplus, although marketing is done individually. Due to lack of storage and limited income generating enterprises, the farmers sell off most of their surplus maize immediately after harvest. The small-scale farmers sell about 20% and 80% of the maize surpluses on and off-farm, respectively. Of the off-farm produce, 85% of the maize surpluses are sold to rural

traders/agents. Integration of producers/farmer groups in maize value chain is viable but there is need for capacity building in production and post harvest handling and institutional development, provision of production and market information, and organize producers into viable groups for production and marketing of the products and reorient the producers to high value markets.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.0

Maize is predominately produced by smallholder producers who include both women and men. There are several small-scale businesses established for producing and marketing maize products. Women and youth play a key role in development and marketing of these products. The two groups participate in production and marketing. The disabled are also involved in some aspects of maize production including shelling and marketing of fresh and boiled maize. Maize value chain involves many stakeholders and beneficiaries including producers, seed companies, traders, millers, and feed and food manufacturers. There is need for LEAD to apply similar strategies such as NANEC that involve all chain actors in the maize VC.

Potential for highest use of productive resources in project areas – 7.5

Investment in increasing productivity of maize will greatly benefit the small-scale farmers who are the primary producers of maize. The situation of maize is not very far from rice. The northern, eastern and Midwestern regions have higher potential for use of productive resources than the rest of the country because of a number of reasons. First, the north, western and mid western have generally flat light sandy clay soil that is easy to open, a situation suitable for extensive maize production. It has long dry season suitable for clean seed/grain production and proper grain filling. Second, the northern and mid western and eastern farmers are cereal crop farmers who have been growing maize for some time. It is therefore easy to increase maize production given required productive resources. Third, maize farming is an enterprise that has a short gestation period. This is very good for the farmers in northern Uganda who are settling and making quick investments. Fourth, labor cost in northern Uganda is relatively cheap making maize production cost relatively low. Lastly, the area has relatively good network to DRC and Sudan and other parts of the country.

The rest of the country has two strategic advantages. First, there is high population making maize marketing competitive. Second, the region has good road network and better accessibility to electricity. These factors make maize value addition easy. Thirdly, western Uganda that produces a lot of maize is near DRC and Rwanda for ease of marketing.

Potential for "bankability" within a reasonable timeframe – 2.5

Uganda Commodity Exchange is a registered brokerage company engaged in maize marketing that brings maize sellers (who are mainly urban traders, commercial farmers and a few organized farmer groups) and buyers (local and foreign companies) together. Through direct negotiations with the different parties, it reduces the number of participants along the chain, helps in price setting and enables quick conclusion to maize transactions. The Warehouse receipt system weakly being implemented in various maize production areas in the country can also enable farmers access credit. Currently, no bank gives agricultural credit in the country and available commercial banks give loan at high interest rates. Micro-finance institutions are not

favorable for agriculture and repayment schedules are not friendly to farming but more to business. This discourages investment in agriculture. Just as rice, processors and traders are more likely to benefit from most financial institutions than producers.

Overall importance in Uganda's agricultural economy – 8.5

Maize has now become a non-traditional cash and export crop. In the last 10 years, annual maize export earnings have averaged 18 million US dollars annually (US Dollars 13.7 and 23.8 million in 2003 and 2007, respectively) (FAO) compared to cotton that earned $19.7 million in 2007. Maize still remains a food security and nutrition crop and source of household income in Uganda.

2.1.1.3 Sorghum and Millet

Market potential (Sorghum – 6.0; Millet – 5.0)

Market potential is medium for millet and sorghum. In Uganda sorghum and millet are mainly used for food, brew, porridge and composite flours in both rural and urban areas. Millet is the second most important cereal in the north mostly important in the domestic market (market is underdeveloped). The sale of millet in the domestic market is informal and underdeveloped. Improved sorghum variety called "Epuripur" is used for commercial production of Eagle Lager beer by Nile Breweries Limited (NBL) and brewers mash is used as livestock feed by Zero grazing farmers around Jinja town. Sorghum grain is used to fertilize fish ponds in Masindi district. South Africa Breweries (SB Miller) opened another factory in 2003/4 to produce Lager beers from Epuripur in Zambia. Tanzania produces opaque beer brands (Chibuku) and composite flours form sorghum and millet. Most of the beers brewed in Uganda from sorghum are exported to Sudan and DRC. Millet is an important ingredient for making local brew and used as yeast. Other industrial uses of sorghum and millet include composite flours, baby foods, baking and animal feeds. There are sorghum varieties currently being tested for nutritional value as livestock feed (pasture).

Cross border trade on sorghum and millet grains and sorghum and millet-based products involves Kenya, Southern Sudan, Tanzania, Rwanda, and DRC and most are informal.

Impact on food security (Sorghum – 6.0; Millet – 6.0)

The potential is medium on food security. Millet and sorghum are second and third most important traditional staple cereal food crops after maize in Uganda especially for the semi-arid areas and mostly eaten with cassava (composite flour). Millet and sorghum are mainly grown in drought prone areas of eastern, northern and southwestern regions of Uganda. There is also slight production of millet in western Uganda where it is used as flour. The availability of amino acid in millet makes it nutritionally very important. Millet is rich in tryptophan, cystine, methionine and total aromatic amino acids (phenylalanine and tyrosine) so very important nutritionally. In the west, sorghum is used for making porridge, an important nutritious drink.

Potential impact on income (Sorghum – 6.5; Millet – 5.0)

Millet and sorghum are produced primarily by smallholder farmers on land areas of less than 0.5 ha on average. Millet and sorghum are sources of income for farmers in the northern and eastern Uganda although they are mostly sold in the domestic

market. Sorghum is also targeted for end users like the breweries (NBL), bakeries, composite flours (Maganjo Procto Allan) and livestock feed (UGACHICK) industries. Nile Breweries in 2002 developed a more affordable Eagle Lager beer product out of Epuripur sorghum compromising the high quality standards set by Nile special and Pilsner beer brands. Organized farmers groups and individual farmers are involved in the production of Epuripur for NBL industry for beer making. Farmers are assured of cash after production of sorghum. In 2004, farmers in northern and eastern Uganda produced 1,677 tons of Epuripur and earned 503 million Uganda Shillings. In 2005 and 2006, they produced 2,371 and 9,000 tons, respectively and earned 711 million and 2.7 billion Uganda Shillings, respectively (Eagle News 2007). Millet on the other hand has underdeveloped market and is mostly sold in the domestic market informally. Millet is also used for brewing (local brew to raise cash) and used as composite flour with soybeans (Maganjo Grain Millers).

Informal domestic and cross border trade on sorghum and millet grains and sorghum and millet-based products involving Kenya, Southern Sudan, Rwanda, and DRC has also increased farmers' incomes among rural and urban populations although area of production has remained generally low compared to maize.

Location - specific advantage (Sorghum – 7.0; Millet – 7.5)

Sorghum and millet are mostly grown in northern and eastern Uganda with also substantial production in the west (millet) and southwestern Uganda (sorghum). Both sorghum and millet have more advantage of expanding production in the north due to availability of land, cheap labor, good growth conditions, and they fit well in the farming system, the resettlement of IDPs and availability of markets in DRC, Sudan, Rwanda and Kenya. There are good accessible roads to link producers to the markets (domestic and regional markets).

Potential to increase Value and Volume (Sorghum – 6.0; Millet – 5.0)

The potential to increase value and volume is good (medium). There is need to plant improved varieties of sorghum and millet and use improved agronomic practices in order to increase volume and value. There is need to diversify and increase the utilization bases of millet and sorghum (livestock/forage feeds, baking, beverages, bio-fuel and composite flours) to attract investment and increase demand in the domestic and export arena so that volume and value is improved. There is also need to develop many adaptable varieties of millet and sorghum and good agronomic practices. LEAD needs to invest in breeder and foundation seed production and technology dissemination.

Potential for value addition, premium price capture and industrial use (Sorghum – 5.5; Millet – 4.0)

Potential could be high for millet and sorghum if utilization base could be increased and also linked to industrial use. Diversifying utilization base in the food and feed industries, bakery, brewing, and composite flour would attract premium price. Value addition can be achieved through improved post harvest handling and processing. As of now, only the domestic market is being considered and utilized.

Potential for private Sector/producer linkages (Sorghum – 7.5: Millet - 5.0)

The potential is high for sorghum and medium for millet. Sorghum and millet are produced by small scale farmers in small land areas. The producers also produce

millet and sorghum seeds for seed companies on contractual arrangements. Other private sectors linked to producers through development of improved varieties and crop management technologies (participatory approach involving researchers, farmers/groups, extension agents, NGOS/CBOs), seed production and marketing (seed companies involved in seed production and marketing include Akukurnut Seed Company, Soroti District Farmers Association(SODIFA), FICA Seeds, Harvest Seed, Grow More Seeds and East Africa Seed Company), food and feed processing (NBL, Maganjo Millers, Kasawo Grain Millers, Proctar Allan, Ugachick Poultry Breeders, Soroti Sorghum Producers Association Soroti District farmers women groups in Gweri Dakabela and Atiira sub counties), and marketing (traders and exporters). There is need to strengthen existing linkages and establish new ones between private sectors and producers.

Potential to leveraging private sector/public sector investment (Sorghum – 7.5; Millet – 5.0)

Potential is good although few private investors are willing to invest due to low utilization base. NARO as a public institution is involved in technology development and promotion while NAADS in advisory activities and MAAIF in policy issues. Seed companies are involved in production and marketing of seeds but on a small scale. Private sectors involved in value addition/processing – milling (grain millers), brewing (NBL), human food manufacturing (Maganjo Grain Millers, Kasawo Grain Millers) and animal feed manufacturing (Ugachick Poultry Breeders, Bright Chick), LEAD should support leverage of the private and public sector investment to increase production and generation of income and ensure food, nutrition and income security. Private sector is reluctant to support millet research except for the beer sorghum variety Epuripur being used by NBL. There is need to invest in more beer varieties for sustainability of the industry.

Viability of integrating producers/ farmer groups into Value chains (Sorghum – 7.0: Millet – 5.5)

The potential is medium to high. Millet and sorghum are produced by smallholder farmers mostly as individuals and a few as farmer groups. There is need to support farmers and farmer groups to enhance their capacities for increased production and proper post harvest handling (provision of production and marketing information). There is also need to organize farmers to take advantage of the available sorghum market with the breweries (NBL) in order to maximally benefit from the venture.

Potential for participation by wide range of beneficiaries (Sorghum – 7.0; Millet – 6.0)

As noted above, millet and sorghum are produced by smallholder farmers who are mostly the women and youth who provide the bulk of the labor required for production. Need for coherent partnership among the value chain actors for better sharing of benefits right from production through processing to marketing and consumption. The potential beneficiaries include resource poor smallholder men, women, youth and vulnerable groups. Other beneficiaries in the millet and sorghum value chain are seed companies, processors and millers, traders, food and feed processors, breweries, NGOs and CBOs, and the consumers. Millet and sorghum are major source of carbohydrates and income to a number of beneficiaries in the north

and east. There is need to apply similar strategies such as NANEC that involves all stakeholders in the value chain. Participation of wide range of beneficiaries will lead to improved income and livelihoods in both rural and urban areas.

Potential for highest use of productive resources in project areas (sorghum – 5.5; Millet – 5.0)

The potential is medium for both crops. Northern and eastern regions are areas for expansion of production of millet and sorghum. North and east have generally flat light sandy soils, easy to open and suitable for extensive production; northern farmers are millet and sorghum farmers over the years; low labor cost in the north; relatively good communication network and availability of markets in DRC, Sudan and Kenya gives the north advantage over the south for increase in production. The rest of the country (western and southwestern) has two advantages of good road network and better access to other services such as electricity. But there is need to develop the required and adaptable varieties for both crops and most of the varieties are old and low yielding except for Epuripur sorghum to make useful gain from the available resources.

Potential for bankability (Sorghum – 3.0; Millet – 1.5)

Potential is medium for Sorghum and low for millet. Producers are most likely to benefit less from financial institutions in terms of credit access but may benefit from warehouse receipts if producers are organized into producer organizations. Sorghum farmer groups producing for breweries (NBL) may benefit from warehouse receipt system. Widening utilization base of millet and sorghum may increase demand and therefore, the need to increase production and therefore, need for financial support or credit access. Processors (millers and brewers) are more likely to access credit facilities easily than producers.

Overall importance in Uganda's Agricultural Economy (Sorghum – 5.0; Millet – 4.5)

Millet and sorghum are the second and third most important traditional staple cereal crops after maize in Uganda. Uganda produces about 732 MT of millet and 458 MT of sorghum over land area of 437,000 and 314,000 ha, respectively. It is mainly grown in the drought prone areas of Eastern, Northern and South Western parts of the country. The production of sorghum are lower compared to other countries in the ECA region (ASARECA1995). The reasons for low productivity are diverse and complex include low technology adoption, drought and low soil fertility, striga weed infestation, pests and diseases and market related problems. Despite the problems, a number of smallholder farmers in Uganda depend on millet and sorghum for their income, food security and nutrition security and improvement in their livelihoods especially people in the northern, eastern and western Uganda.

2.1.1.4 Barley

Market potential – 5.0

Barley is one of the raw materials in the brewing industry where it is used either as malt or as an adjunct. Currently barley is being bought by Uganda Breweries Limited (UBL) for producing non-malt beers and I presume this will continue as there is government incentive for use of local materials in manufacturing industries. In the

long run, there it is believed that with the development of the crop and more reliable weather it could be exported within the region. As of now, there is no official export of barley in the region.

Until 2003/4, when Nile Breweries started using sorghum in brewing beer but to a limited extent, both Uganda and Nile Breweries were dependent on 100% barley importation for the bottled beer brewing industry. Currently the requirement by Uganda Breweries of barley is 10,000 Mt annually of which only 2,500 Mt are now being obtained from Kapchorwa district and the rest being imported. The production in Kapchorwa is dependent on seed being procured from Kenya at a cost of more than Uganda shillings two million per Metric ton. The annual seed requirement stands at approximately 200 Mt which transforms into Uganda Shillings 300 Million. The market potential in the long run can be high but the short term potential is low to medium.

Impact on food security – 1.5

Barley is not traditionally consumed by farmers. It is important in beer making by UBL and Nile Breweries. It indirectly contributes to food security through empowerment of the community through improving their purchasing power when they receive cash from the sale of the crop.

Potential for impact on incomes – 4.0

Barley is a cash crop and definitely impacts positively to the farmers who are producing the crop. Barley can be grown twice a year and thus land utilization can be maximized for income generation. As an import substitution crop, barley could greatly provide increased income to farmers producing the crop. The potential for impact on income is currently low to medium (lack of seeds, less land area farmed and few involved in the farming).

Location-specific advantage – 6.0

Barley is grown in the cooler, high altitude areas of Kapchorwa, Kabale, Kanungu and Mbale districts. At the current moment better production of barley is coming from Kapchorwa and to a very limited extent western Uganda. Location advantage is medium and confined to a few districts (adapted varieties to highland very few).

Potential for increasing value and volume of marketed agricultural production from project areas – 5.0

There is potential for increasing value and volume of marketed product. Currently the requirement by Uganda Breweries of barley is 10,000 Mt annually of which only 2,500 Mt are now being obtained from Kapchorwa district and the rest being imported. Unfortunately, the production in Kapchorwa is dependent on seed being procured from Kenya at a very high cost of more than Uganda shillings two million per Metric ton. The annual seed requirement stands at approximately 200 Mt which transforms into Uganda Shillings 300 Million. If seeds were available, production would increase 10 folds to 25,000 MT to meet breweries requirements. There is potential for increasing volume so long as seed issues can be solved and other marketing strategies with breweries remain in place. As of now the potential is low to medium.

Potential for value addition, premium price capture and industrial use – 5.0

So long as production can meet breweries demand, there is high possibility of value addition and capture of premium price by producers. High production will reduce on

importation and therefore guarantee more income to farmers who produce the crop. There is opportunity also in making animal feed from barley as by products. The potential is currently low to medium for reasons named above for increasing value and volume.

Potential for private sector/producer linkages – 7.5
Barley production is essentially private sector led as it is not directly consumed by the farmers. Private sector therefore guarantees the market, produces the seed and purchases the grain for the beer industry. Barley products can include animal feed too. Therefore, the potential for private sector/producer linkage is very high.

Potential for leveraging private and/or public sector investment – 6.5
As private sector led sector, there is potential for leveraging private and public sector investment. Government of Uganda has always encouraged the use locally produced raw materials for development industries in Uganda. The investment policy therefore ensures this which therefore benefits the producers and our industries resulting in increased employment. The potential is medium to high.
Viability of integrating producers/farmer groups into value chains – 7.5
This is very high as evidenced by the marketing chain in Kapchorwa. Farmers have formed a group that manages production of the grain, purchases supplies and sells the grain to Uganda Grain Traders association that then sells it to UBL.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 5.5
This is medium to high as evidenced by the marketing chain in Kapchorwa. Farmers have formed a group that manages production of the grain, purchases supplies and sells the grain to Uganda Grain Traders association that then sells it to UBL although the range of participants is still narrow.

Potential for highest use of productive resources in project areas – 5.0
Barley is cooler, high altitude environment crop more suitable for areas of Kapchorwa, Kabale, Kanungu and Mbale districts. At the current moment better production of barley is coming from Kapchorwa with better production and marketing arrangement. The potential is medium.
Potential for "bankability" within a reasonable timeframe – 3.0
Being a private sector-led initiative, there is low to medium potential for bankability. Producers can benefit from warehouse receipts from the private sector. There is high possibility for accessing financial capital from the private sector much interested in use of barley in their industries. Being a short season crop, return to production is expected over a relatively shorter period of time ensuring farmers/farmer groups of the required income.

Overall importance in Uganda's agricultural economy – 3.5
The beer industry is one of the highest tax payers in Uganda. Therefore, locally produced barley reduces on the need for forex for purchase of barley products for the industry. The farmers also earn substantial incomes from their barley produce. The

potential is high but the current production is so low to meet the needs of the industries and raise substantial income for the government.

2.1.2 OIL SEEDS

When oil crops (sunflower and sesame) are considered, the stakeholders felt that sunflower was of a much higher ranking (8th overall ranking position compared to other commodities) than sesame (11th overall ranking position) due to ready market, available varieties and market for the produce, the wide range of uses (oil and animal feeds) and the organized mode of production and marketing currently in place. Many private sectors dealing in manufacture of oil have come up increasing demand for the seeds. Sesame varieties much preferred in the markets according to stakeholders have become mixed with older varieties making production of the pure seeds difficult and the production and marketing is less organized compared to sunflower. Details are as below.

2.1.2.1 Sunflower

Market potential – 8.5

Market potential for sunflower is very high as the current supply is far less than demand. There is great demand for seeds by the farmers as is seen by the buying of hybrid seed for planting at 10,500= per kilogram. The high cost of the seed is due to the fact that the seed is imported from South Africa some of which is exported to Sudan through Uganda. The hybrid seed, PAN 7351, is imported into Uganda by Mukwano Group of companies. The hybrid yields twice as much as the local sunfola (1,500 kg/ha for hybrid compared to 625 to 750 kg/ha for sunfola) under no fertility improvement and much higher oil content (47% versus 30%). If Uganda can produce its own sunflower variety then this will substitute for importation and make it easier and cheaper to export to Sudan than getting seed from South Africa. There is a possibility of releasing soon to the market locally adapted high yielding hybrids variety by NARO.
The grain produced by farmers is bought by oil millers immediately after harvest. The oil millers use the seeds for extraction of oil for cooking and making soap. There is far much higher demand for sunflower seeds by oil millers or processors which far exceeds supply. Domestic production satisfies only 35-40% of domestic demand, with balance met by imports. Mukwano is the largest processor of domestically produced sunflower oil as an import substitute. The market potential is good for processing of oil which can substitute for palm oil and others currently being imported. The cake is good for animal feeds (development of feed sector from sunflower byproducts).

Impact on food security – 2.0

Sunflower is important food crop for extraction of oil by local oil processors and large scale processing. The oil obtained from sunflower seed is used for cooking and manufacture of soap. The harvested seed is eaten raw in Karamoja. The seed can also be roasted, pounded and used as sauce just like groundnut or sesame paste. Its impact on food security is of low to medium as direct consumption is very limited to few individuals.

Potential for impact on incomes – 7.0

The impact on income at household level is high. There is ready market for sunflower grain produced by the farmers. Mukwano Group of Industries which is the main buyer of sunflower has buying centers in the north and mid western Uganda for purchase of sunflower immediately they are harvested by farmers thus giving farmers market assurance. Apart from Mukwanu Group of Industries, there are many small scale oil millers in the north (Lira and Apac) who also purchase sunflower from farmers to produce oil. Most of the oil is exported to southern Sudan and DRC. The income generated from sunflower is used by the producers to meet other family obligations. It should be noted that sunflower is grown twice a year meaning farmers are assured of the income twice a year although the price per kilogram may be low.

Location-specific advantage – 7.5

At the moment, the most advantaged location for production of sunflower is mainly the north and east with the highest production from Kitgum, Pader, Apac, Lira, Kotido, kapchorwa, Amuru and Gulu districts. There is some production in mid western Uganda (Masindi, Hoima and Kasese districts) and central Uganda. The extended dry period experienced in the north during the season allows for proper drying of the crop after harvesting without the head getting rotten due to rain (sunflower is tolerant to dry condition). The north also has the advantage of cheap labor especially from the IDP camps and available large land areas which can be used for production. The environmental conditions (agro-ecology) also give the north the advantage to produce large quantities of sunflower compared to other locations.

Potential for increasing value and volume of marketed agricultural production from project areas – 5.5

Available large land area, cheap labor and favorable agro-ecological/environmental conditions coupled with fertile soils in the north (soils not used for production for decades) favor increased production (increased volume) of sunflower. Development of locally adapted high yielding sunflower varieties rather than import from South Africa and the use of improved agronomic practices would greatly improve volume and value of marketed sunflower especially noting that there is higher demand for the seeds by oil millers compared to what producers can supply. Although it is grown mainly in the north and part of the east, sunflower can also be grown elsewhere especially western Uganda. Therefore, there is need to invest in variety development and breeder seed production as the local sunfola variety is lower yielding (750kg/ha) than the imported hybrid (1,500 kg/ha with no fertilization and up to 2,500 kg/ha with fertilization). Use of hybrids and improved agronomic management practices such as fertilizer will increase value and volume of marketed products. Mukwano built a large warehouse in Lira as part of its program to stimulate small farmer sunflower production using imported hybrid seed variety Pan 7351. Mukwano plans to have over 100,000 farmers in the north (Lira, Apac and Masindi districts) producing 300,000 tons of seed (Mukwano will offer farmers good hybrid seeds, a secure market and predictable prices). The potential is at medium level but can be improved with locally adapted, high yielding varieties.

Potential for value addition, premium price capture and industrial use – 8.0

The potential for value addition is high although the premium price is not captured by the producers or the farmers but rather the processors. Oil is extracted from the seed and used for cooking and industrial manufacture of soap. Sunflower oil can be used in

bakery and in industries for lubrication. By products from sunflower is good for making animal feed (sunflower cakes). Bees that pollinate sunflower also collect nectar and pollen from sunflower which they use in making honey. The honey from the north has the best taste and people think it fetches premium price. There is also potential in the long-term for use of sunflower as bio-fuel which is not possible in the short and medium term. There is need to invest in variety development and seed production.

Potential for private sector/producer linkages – 8.0

The potential is very high. Sunflower is mainly produced by smallholder farmers. Seed companies (FICA, Victoria Seed Limited, East African Seeds, NASECO and Harvest Farm) are involved in production of seeds on contractual basis with farmers and marketing (mostly local variety sunfola). The farmers or producers are provided with seeds on contract by processors such as Mukwano Group of Companies to produce the grains which processors used in extraction of oil for making cooking oil and soap. Mukwano works with out-growers (7,500 farmers) under contract with direct governance structures. Mukwano Industries provide the farmers with the inputs and are buyers' of farmers' produce. Other farmers numbering over 27,000 small scale farmers independently producing local sunflower seed (sunfola) and marketing direct to local millers for processing. These independent farmers are governed by the market forces. The local sunfola is being promoted by Uganda Oil Seed Producers and Processors Association (UOSPA). UOSPA is an association of farmers and millers with main functions of increasing seed production, training farmers and extension agents in agronomic practices, bulk marketing, post harvest handling and nutrition. The cake byproduct is used for making of animal feed at local level. The potential for private sector/producer linkage is high and there is need to involve many active private sectors, and enhance capacities of the producers for sustainable linkages and production. Most activities are private sector-led.

Potential for leveraging private and/or public sector investment – 7.5

Potential is high. Both public and private sectors are involved in the sunflower value chain. National Semi Arid Resources Research Institute (NaSARRI) under NARO, a public sector, is mandated to undertake research on sunflower (development of new varieties, evaluation and dissemination of proven technologies and multiplication of breeder and foundation seeds of both new and old varieties). A number of seed companies (OTIS, FICA, Victoria Seed Limited and NASECO) are all investing in production of seeds and marketing. UOSPA is involved in increasing seed production, training farmers and extension agents in agronomic practices, bulk marketing, post harvest handling and nutrition. NAADS are involved in advisory services while MAAIF are involved in policy issues. NGOs/CBOs are all involved in general extension services, provision of inputs and information and capacity development. Processors such as Mukwano Group of Companies and other oil millers on small scale have invested in extraction of oil and traders in export of the oil and soap to Sudan and DRC. There is need to create conducive environment for leveraging investment from both sectors and support interventions with the best returns (variety development and seed production, processing and animal feed manufacture).

Viability of integrating producers/farmer groups into value chains – 7.5

Sunflower is normally grown by small scale farmers or producers on large area in order to maximize the return (one important reason why the northern is more advantaged in production of sunflower). In eastern and northern Uganda, Mukwano and UOSPA have formed a number farmer groups. Mukwano works with out-growers (7,500 farmers) under contract with direct governance structures. Mukwano Industries provide the farmers with the inputs and are buyers' of farmers' produce. UOSPA works with over 27,000 small scale farmers with main functions of increasing seed production, training farmers and extension agents in agronomic practices, bulk marketing, post harvest handling and nutrition. This is to help increase volume of sunflower produced and marketed. Farming as groups also help the farmers improve on their bargaining power for better prices and better marketing (economy of scale). Mukwano built a big warehouse in Lira to ease collection of produce from the farmer groups they work with. For ease of production and collection of the produce, farmers and their groups are properly identified to village level. Proper farmer group identification makes collection of seed easy at the collecting centers where the company has site coordinators to help in seed distribution and buying seed from farmers. Therefore, farmer groups/producers are well integrated in sunflower value chain. There is need to enhance capacities of the farmers to fully take advantage of the sunflower and sesame value chain for better benefit. Therefore, the potential is very high.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 7.0

There is high potentiality for participation by a wide range of beneficiaries. The farmer groups who have already been formed under the arrangement of UOSPA and Mukwano include men and women. Women provide the bulk of the labor for production of sunflower in terms of planting, weeding, harvesting, threshing and marketing. The disabled are also involved in the threshing and occasionally guiding in the field. As for the case of quality seed production, women and also the vulnerable are involved and most are supported by NAADS, Mukwano or UOSPA. Other beneficiaries in the value chain include agro-input suppliers, NARO, NGOs/CBOs, rural traders, small scale processors, transporters, sunflower oil wholesalers and retailers, exporters and animal feed manufacturers.

Potential for highest use of productive resources in project areas – 6.0

The potential is medium to high. Sunflower is produced more in the north where there is available land, labor resources and good agro-ecology. The fact that farmers are already producing organically some of the crops give advantage for the use of available resources such as organic fertilizers which are available as sunflower needs addition of fertilizers in order to improve its productivity although sunflower can perform relatively well under marginal soil conditions compared to other crops. Cow dung and poultry droppings can be used as a source of organic manure to improve yield. Since sunflower is pollinated by bees, the many bees around collect pollen and nectar from sunflower which they use in making honey. Honey becomes a product of great importance for raising income for farmers in the north which is thereafter of economic benefit to the farmers.

Potential for "bankability" within a reasonable timeframe – 4.0

Potential for bankability is low to medium but can be improved. Formation of out grower schemes and warehouse receipts currently being practiced by Mukwano and UOSPA can benefit producers to access credits. Processors better place to access credits more easily than producers. Finance and credit facilities as of now are more available for procurement and marketing than to finance farmer crop production. Microfinance scheme which targets producers can be a possibility of improving access to finance/credit. Otherwise as of now, microfinance institutions do not favor producers.

Overall importance in Uganda's agricultural economy – 5.5

Sunflower is very important in the economy of Uganda. The seed is used for extraction of oil which is sold locally or exported to the neighboring countries such as Sudan, DRC and Rwanda to raise foreign exchange. The seed cake is used for feeding livestock. The market is assured although premium proceeds go to the processors. It is important as a catch crop in the sense that it can be planted during the time of less rain when other crops can not survive. Integrating sunflower production with apiary helps in production of high quality honey to raise more income to the farmers.

2.1.2.2 Sesame

Market potential – 8.0

According to Mr. Alex Jan of SHARES Company that deals in export of sesame, there is high market potential for Sesame in the domestic and international market in the short, medium and long run. The increase in sesame price from 1,500=/kg last year to nearly 3,500=/kg early this year seems to indicate the increase in demand for sesame seed. Sesame is used for extraction of oil locally by small scale oil processors. It is locally consumed by the local community in form of paste. The seed is sold in the local and town markets. Sesame seed is exported to Sudan where there is high demand for it. Internationally, the seed is exported to countries like Turkey, Far East Asia, USA and Europe. Uganda produced about 168,000 MT of sesame seed and exported worth US Dollars 5,455 million in 2007 (FAO Data Base). Sesame oil would be a good import substitution for other types of oil such as palm oil. Currently, the demand in the domestic, regional and international markets is far greater than supply. SHARES in 2007 purchased 1,200 MT which it exported yet the export markets demanded almost three times the amount exported. The white Ugandan sesame is highly preferred in the international markets. The problem is the availability of good quality seeds for production of sesame seeds, so the need to invest in sesame breeder, foundation and certified seed production.

Impact on food security – 5.0

Sesame is locally consumed by the local community in form of paste and also used locally for extraction of oil for cooking. The surplus is sold to the market but a farmer will always make sure that sesame seed is available for home consumption. The oil obtained from sesame seed is used for cooking. Sesame oil could be good substitute for imported palm oil or any other type of oil imported if the industry good be improved to meet demand. The seed is eaten raw or roasted. The roasted seed is pounded and used as sauce just like groundnut.

Potential for impact on incomes – 6.0

There is ready market for sesame both locally and abroad. Current supply is far less below demand in the export markets especially for the white sesame seeds. Sesame seed is also sold in a small amount in the domestic markets or sold to seed dealers either in towns or stockists in the rural areas. Farmers are therefore able to raise household income from production of sesame seed. Local oil processors are also able to raise income from the sale of the oil. Therefore, sesame remains source of income to many small holder farmers in the north and east although seed quality remains a problem.

Location-specific advantage – 8.0

Sesame is a drought tolerant crop and that is why it thrives best in northern Uganda in the districts of Apac, Gulu, Kigum, Pader, Amuru, Lira, Nebbi, Soroti, Arua and Moyo. There is some production in eastern Uganda (Iganga and Kamulu districts) and slight production in mid western Uganda (Masindi and Hoima districts).The availability of vast land area, good agro-ecological environment and cheap labor makes north the ideal place for production of sesame. The dry period experienced immediately after harvest allows for the drying of the seeds without rotting (sesame prune to rotting when there rain during drying due to the nature of the pods which are able to take in water once dry). The vast area of land available in the north for its cultivation compensates for the low yield per unit area thereby allowing increased production through large area expansion for its production.

Potential for increasing value and volume of marketed agricultural production from project areas – 5.0

The vast amount of fertile land available for cultivation in the north, the cheap labor and good agro-ecological environment allow for increased production through increase in production acreage. There is potential for increase in value as production is increased noting the increasing price of sesame in the domestic and regional markets. High demand for the seed for extraction of oil and the ready domestic, regional and international markets are all incentive for increase in volume and value. Sesame seed can be used for other products of better value. The oil is premium oil which fetches high price in the local market. The seed can be used in sweetening and in bakery industries. The current good price of sesame is a greater incentive to increase in value and volume of marketed sesame. The use of locally adapted white variety and good agronomic practices can lead to increase in volume and value but there is need to improve on supply of improved, pure seeds.

Potential for value addition, premium price capture and industrial use – 7.5

Oil extracted from the sesame seed is used for making cooking and manufacture of soap. The oil is also used in the bakery industries, pharmaceutical industries, perfume industries and chemical industries as a synergist for insecticide companies. Production of organic sesame captures premium price in the regional and international markets. The byproducts can be used for making animal feeds. Bees collect nectar and pollen from the sesame flowers and therefore the nectar and pollen help in manufacture of high quality honey. All these add value to sesame products with attainment of premium price. In most cases, the premium price is captured by processors through value addition and not the producers. There is need for production of organic sesame and value addition to sesame.

Potential for private sector/producer linkages – 7.5

Seed companies (FICA, Victoria Seeds) are involved in seed production through contractual arrangement with farmers or farmer groups (producers). The farmers or producers produce the sesame seeds which are sold to traders and exporters such as SHARES. Small scale oil miller/processors procure seeds from the producers which are used in extraction of oil. Byproducts are used in manufacture of feed. There is need to involve many active private sectors and enhance capacities of producers and private sectors to create sustainable linkages otherwise the potential for linkages are very high.

Potential for leveraging private and/or public sector investment – 6.5

A number of participants are involved in the value chain. The National Semi Arid Agricultural Resources Research Institute (NaSARRI) under NARO is a public research institute mandated to develop improved varieties and better agronomic practices for increased production. It also produces breeder and foundation seeds which are disseminated to private seed companies. The agricultural extension staff (NAADS, NGOs, CBOs) also support and give advice (extension services, provision of inputs and information and capacity enhancement) to private seed companies and farmers alike in order to boost production. MAAIF is more involved in policy formation. Traders and exporters such as SHARES invest in purchase of seeds from the producers. SHARES also provides extension advice on better production methods in order to increase production. Local processors (oil millers) invest in extraction of the oil after purchase from producers. There is need to create conducive environment for leveraging investment from both sectors and support interventions with best returns. Therefore, the potential for leverage is medium to high.

Viability of integrating producers/farmer groups into value chains – 7.5

The potential is high. Sesame is normally grown in a large area in order to maximize the return. In northern Uganda, SHARES company have formed farmer groups and working very closely with Lango Organic Farmers in the districts of Apac, Lira, Oyam and Dokolo to produce organic sesame. BOWEEVIL, a company managed by Jan Alex for production of organic cotton takes the advantage to integrate sesame in the cotton-sesame rotation. Cotton is always the opening crop followed by sesame which drastically reduces on labour requirement for opening land for sesame. Large numbers of independent farmers produce sesame to sell to the open domestic markets through middlemen (traders) and to neighboring Sudan and DRC through cross border trade.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 6.5

A range of beneficiaries including women and vulnerable groups have potential to participate in the sesame value chain. Producers (including women and youth) are involved in production of seeds through contractual arrangement with seed companies. The farmer groups produce the required seeds which are later sold to traders and local oil millers. These farmer groups are composed of both men and women. The women provide the bulk of labor for production of sesame. Exporters such as SHARES are involved in purchase and export of the seeds. NARO is involved in development of appropriate production technologies while NAADS/NGOs/CBOs are involved in advisory services. The disadvantaged such as the IDP people are all involved in the production of sesame as part of these groups. There is need to create

an environment which allow participation of a wider group of participants or beneficiaries.

Potential for highest use of productive resources in project areas – 6.5

The potential is medium to high. Sesame is normally grown on marginal land although performance is better on fertile soils which are quite plenty in northern Uganda after decades of not using most of the farm land. In marginal areas, there is potential for use of locally available fertilizer resources such cow dung, poultry droppings and other sources of organic manure to improve yield. Good agro-ecological conditions and cheap labor makes production of sesame more advantageous in the north with more efficient use of productive resources. Possibility of producing organic sesame much demanded in the regional and international market (fetching premium price) makes the north more suitable production environment for use of productive resources.

Potential for "bankability" within a reasonable timeframe – 3.0

As was the case for sunflower, formation of out-grower schemes and warehouse receipt system may improve access to credits by producers. Currently, SHARES company assist their producers (their organized farmer groups with resources inform of inputs) but these are few compared to the bulk of the farmers involved in sesame production. Processor and marketers are better placed to access credits from microfinance institutions. But we should note that sesame can be grown twice a year and there is ready market for the seed. Producers, traders, exporters and processor are able to generate income at least twice in a year. Short growth period of 3 months means quick return to investment.

Overall importance in Uganda's agricultural economy – 5.0

Sesame is very important in the economy of Uganda. The seed is used for extracting cooking oil which is sold locally. The seed itself is normally exported to the region (Southern Sudan, DRC) and internationally raising foreign exchange (Uganda earned 5,447 million US dollars from sesame seed in 2007). By product from extraction of oil is used as animal feed. It is used in bakery and other industries raising income to processors. It is important as a catch crop in the sense that it can be planted during the time of less rain when other crops can not survive. Integrating sesame production with apiary helps in production of high quality honey which is used to raise income for farmers. Farmers realize income from production of sesame especially farmers in northern Uganda.

2.1.3 PULSES

Considering the importance of the three crops under pulses (common beans, groundnuts and soybeans) in terms of market potential, food security, income generation and overall importance in the agricultural economy of the country and the other set criteria, stakeholders agreed that common bean was the most highly rated (score of 106 or 75.7% or 4th overall ranking position) followed by groundnuts (score of 94.5 or 67.5% or 7th ranking position) and closely followed by soybeans (score of 93.5 or 66.8% or 9th overall ranking position).The details of the analysis is as below.

2.1.3.1 Common Beans

Market potential – 8.5

Beans have very high market potential in the domestic, regional and international markets in the short, medium and long run. The current situation is that supply is far below demand. In the domestic markets, beans are required by various categories of consumers including schools, hospitals, military, prisons, and many households. Beans are in high demand in the regional markets and many are sold to DRC, Sudan, Rwanda and Kenya. The beans from Uganda acts as gap filler to the bean deficits required in Kenya. In the international markets, Uganda beans have demand. ACOS, an Italian based company recently tested NABE 12C bean (a climber) for its canning quality and found it to be the best worldwide. They are demanding for a minimum of 50,000 MT every season for their canning industry. Huge markets exist in southern African countries for sugar beans in Mozambique for their schoolchildren feeding program and in other countries like Malawi and Angola. In terms of export value, Uganda exported beans worth US dollars 10,099 million in 2008. Beans are ranked third in terms of export volume and eighth in terms of export value among the nontraditional export commodities. In terms of gross contribution to the country's GDP, beans account for 7% of the total national agricultural GDP (nontraditional export crops) after banana, cassava, sweet potatoes and maize) and has remained the most important legume crop in Uganda.

Impact on food security – 9.0

It is the most widely grown and consumed legume and household institutional source of protein in Uganda providing 45% of total protein intake and 25% of total calorie uptake. Bean is also valuable sources of vitamin B complex, crude fiber, folic acid, zinc, iron, amino acids and other essential minerals. It is the most preferred grain legume due to short maturity period (<3 months), high nutritive value, relatively long storage and convenience of handling the harvested produce and its compatibility with other crops in many low input production systems makes it one of the most important food security crop in Uganda.

Remarkably, beans also have high nutritive value. Beans is not only a superior and cheap source of protein (>20%) to over 80% of the rural and poor urban communities many of whom are vulnerable particularly mothers and children but is one of the best sources of iron and zinc (zinc and iron concentration in seed of some of the lines/varieties varies from 45 to 110 ppm and 25 to 50 ppm, respectively with even much higher leaf iron concentrations ranging from 397 to 2498 with mean average of 1119 ppm); two of the most common nutritional deficiencies affecting more than 2 million people in the world (Zn and Fe deficiencies result into anemia, intellectual and mental development). Beans therefore provide the best long-term solution for the control of micronutrient deficiencies.

Potential for impact on incomes – 8.0

Common bean has rapidly evolved from a traditional subsistence crop to a market oriented modern crop with major impact on household food and nutrition security, incomes and improved standards of living in some of the most marginalized communities of Uganda. Bean has high versatility through ease of its conversion to

cash to meet urgent household needs. Bean is a significant source of income for rural households with sale values rising rapidly especially with cross border trade in action. There is great demand for beans in the region than can be supplied (DRC, Rwanda, Kenya, Sudan and most of the southern African states). Since its production is done more by women and children, they are the group who benefit most from production of beans in Uganda why beans are called "women' crop".

Location-specific advantage – 8.0

Beans grow well both in the north and south except for Karamoja area (can also be grown in Karamoja). The favorable growth environment in the north and south makes bean production a lucrative venture country wide. Best producers of beans are western, southwestern and central Uganda followed by northern and eastern Uganda. The north have more advantage than the south because of availability of large land area for production, areas which have not been under cultivation for relatively long time and so fertile, availability of cheap labor and good agro-ecological environment for production of beans. On the other hand, the west and east especially the highland areas are much better placed to produce climbing beans which yield 2-3 times the normal bush beans and require less land area for production than the bush beans in addition to producing bush beans in the low to medium altitude areas. It should also be noted that bean is one crop that has a lot of regional preferences with the north and south preferring different varieties for consumption while varieties for marketing may be similar.

Potential for increasing value and volume of marketed agricultural production from project areas – 8.0

The potential is high. Bush beans have the potential production of 1.5 to 2 tons/ha while climbing beans have potential of 2.5 – 3 tons/ha yet at farm level production of bush beans is at mere 600 to 700 kg/ha and climbing beans at 1.0 to 1.5 tons/ha. The use of improved high yielding bean varieties with resistance to pests and diseases (varieties more preferred for domestic markets and regional/international markets) and proper agronomic practices should greatly improve production (volume and value). Increase in volume of marketed beans would also come from utilization of vast production land in northern Uganda as the IDPs are resettled in their permanent homes. The promotion of climbing beans especially in the high land areas where land is a problem and also growing climbing bean varieties adapted to mid altitude areas would increase value and volume of marketed beans (the varieties are available). Proper post harvest handling and storage to reduce losses are also possibilities to increase value and volume of marketed beans. The current increase in bean price from mere Uganda Shillings 800 to Uganda Shillings 2,000 and the high demand in the domestic and regional markets are all incentives to increasing value and volume of beans. There is also need to add value through processing (canning of beans). There is need to improve capacities of producers in application of good agronomic practices and post harvest handling and storage. LEAD should invest in enhancing skills and knowledge of producers/farmers and seed companies in production and marketing of bean grain and seeds, respectively and also production and availing the required breeder and foundation seeds by NARO and promotion of other agronomic practices.

Potential for value addition, premium price capture and industrial use – 5.0
The current potential is medium but can be greatly improved to high potential for value addition through canning of beans which has never been taken advantage of yet most of our beans sold to Kenya are canned in Kenya and re-imported to Uganda and sold in our supermarkets for consumption by the various institutions at much higher price (premium price). The demand and purchase of canned food including beans has risen especially with establishment of many supermarkets. There are a number of varieties which are excellent for canning which in the long run improves food, health and nutrition security in the country. Improvement in post harvest handling and proper storage will also improve premium price capture. In the last two years, the price of beans has tripled and with increasing demand, we expect the price to even rise higher. The well sorted beans of the preferred varieties usually fetch much higher price than the mixed and less sorted. There is potential for use of beans as composite with other foods to form nutritious food products which can capture premium price.

Potential for private sector/producer linkages – 8.0
Beans are mainly produce by small scale farmers on land area of less than 0.5 with few medium and large scale production springing up rapidly especially with the increasing demand in the domestic and regional/international markets. Seed companies (FICA Seed Limited, Victoria Seed Limited, East African Seed Limited, NASECO, Harvest Farm and many others) produce bean seeds through contractual arrangement with individual farmers or farmer groups who are registered as community-based seed producers. Traders including exporters (Afrokai Limted, Olam and others) purchase bean grains from farmers/producers to either sell domestically or export to the region or internationally. Transporters link producers with buyers/traders. Agro-input dealers avail the required inputs for production. Therefore, the potential for private sector/producers linkage is very high. There is need to LEAD to invest in breeder/foundation seed production and dissemination of improved, high yielding bean technologies and ensure sustainable linkages between producers and private sectors.

Potential for leveraging private and/or public sector investment – 6.5
NaCRRI under NARO is mandated to develop and disseminate improved bean varieties and agronomic practices in order to improve production in a participatory manner with stakeholders. NARO is also involved in capacity enhancement of the farmers to produce good quality seeds and grains. NAADS are involved in advisory services while MAAIF invest in seed certification to make sure seeds produced meet the required standards and policy issues. Seed companies through contractual arrangement invest in production and marketing of seeds. The traders invest in purchase and marketing of the seeds and grains. NGOs and CBOs invest in technology promotion and capacity enhancement. ACOS, a canning company in Italy, is willing to invest in processing (canning) industry in Uganda if volume of NABE 12C can meet its demand. Potential for leverage of investment from private and public is high in bean improvement sector. Issues of concern still remains in securing enough breeder/foundation seeds

and maintaining quality of certified seeds by National Seed Certification Service (NSCS) on the markets and ensure that farmers receive the required improved bean varieties (being self-pollinated crop to avoid recycling of seeds)

Viability of integrating producers/farmer groups into value chains – 9.0

Bean is a crop produced mainly by small scale farmers the majority of whom are women and youth why the name "woman's crop" on less than 0.5 ha of land with a few medium scale producers. Farmers or farmer groups are trained by NaCRRI, NGOs and CBOs in production of good quality seeds and grains to fetch premium price. Usually production is carried out with less use of external inputs. Marketing is by individual farmers of the surplus after the amount for consumption is taken although there is much effort by NGOs, NAADS and CBOs to encourage group marketing for better bargaining power. Currently a number of farmer groups are involved in bean seed and grain production either as community-based seed producers or grain producers. Seed and grain producers require support to enhance their knowledge and skills in production and marketing. Therefore, the integration of producers/farmers in the value chain is very viable and possible.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.5

As noted above, bean production is mainly by small scale farmers majority of whom are women and youth. Most of the operational labour for production and marketing are provided by the women and youth. The women, youth and traders are also involved in variety development together with researchers. Other stakeholders involved in the bean value chain include seed companies, traders, NGOs, CBOs and agro-input dealers. Bean value chain also includes actively vulnerable groups such those with HIV for health and nutrition purposes as beans is nutritious. Beans still remain a major source of income, nutrition and food security for many households. Beans are also important in rotation and intercropping with other crops as they improve soil fertility.

Potential for highest use of productive resources in project areas – 7.0

The northern, eastern, western and Midwestern regions have higher potential for use of productive resources for the following reasons. First, the north, western and mid western have generally flat light sandy clay soil that is easy to open, a situation suitable for extensive grain production. The high altitude areas of western and eastern Uganda are suitable for production of climbing beans which are much higher yielding than bush beans. The named regions have been producing beans for over a long period of time. Third, labor cost in northern Uganda is relatively cheap making bean production cost relatively low. Lastly, the area has relatively good network to DRC, Rwanda, Kenya and Sudan and other parts of the country where demand for beans are highest. But beans can be produced across Uganda.

Potential for "bankability" within a reasonable timeframe – 2.5

Potential for bankability is low for producers, medium for seed companies and traders and high for processors although the current situation indicates unfavorable credit terms for seed companies and traders and unavailable or limited processors or value

adders if any. Despite the fact that bean has short gestation period of 2.5 – 3 moths and is produced twice a year with readily available markets domestically and regionally, access to credit resources have been low in the chain. Producers are most likely to benefit less from access to commercial credits from microfinance or banks due to the nature of the credits and their repayment policies. Exporters and traders are more likely to access such credits although it has also not been easy. According to discussion with seed companies, the loan terms do not favor their businesses. The formation of farmer groups may help take advantage of Warehouse Receipt System to improve quality and access to finance as producers and other stakeholders involved in the value chain are in position for much faster and quicker return to investment in bean production.

Overall importance in Uganda's agricultural economy - 8.0

Common bean has rapidly evolved from a traditional subsistence crop to a market oriented modern crop with major impact on household food and nutrition security, incomes and improved standards of living in some of the most marginalized communities of Uganda. Beans are considered very important as food, nutrition and health security crop in Uganda. Beans have very high market potential in the domestic, regional and international markets in the short, medium and long run. The current situation is that supply is far below demand. In the domestic markets, beans are required by various categories of consumers including schools, hospitals, military, prisons, and many households. Beans are in high demand in the regional markets and many are sold to DRC, Sudan, Rwanda and Kenya. In terms of export value, Uganda exported beans worth US dollars 10,099 million in 2007. Beans are ranked third in terms of export volume and eighth in terms of export value among the nontraditional export commodities.

2.1.3.2 Groundnuts

Market potential – 6.5

Considering the domestic, regional and international markets, the market potential for groundnuts is medium. Groundnuts used to be grown primarily for food consumption but the trend is changing. There is good market potential in the domestic and regional markets (DRC, Sudan and Kenya) although quality remains the major concern. The current supply cannot meet the local and regional demand due to low production and poor quality. Export demand for confectionary groundnuts is growing. There is also high demand for improved groundnut seeds of the desired characteristics. There is need therefore to increase the volume and match the market/consumer demand with the varietal development. High premium price is attained when groundnut is of the right quality. A good quality groundnut is pure (at least 95%), has low moisture content (7–8%), high shelling percentage (above 55%), low level of damaged pods/kernels (less than 17%) and no aflatoxin contamination. There is, therefore, scope for export growth in groundnuts so long as quality issues can be solved.

Impact on food security – 7.0

Potential impact on food security is high. Groundnuts are rich in protein and are cultivated in many parts of the country. Groundnut grown primarily for human consumption has several uses as whole seeds or is processed to make peanut butter, oil and other products. The seed contains 25 to 32% protein (average of 25% digestible protein) and 42 to 52% oil. A pound of peanuts is high in food energy and provides approximately the same energy value as 2 pounds of beef, 1.5 pounds of Cheddar cheese, 9 pints of milk, or 36 medium-size eggs (Woodroof, 1983). Groundnut is staple food in Uganda and has become a poor man's meat in the light of expensive animal proteins.

Potential for impact on income – 7.5

Potential for impact on income is high. Most groundnuts grown in Uganda are used for food consumption. The trend is however changing with a lot of trade both within the country and in the neighboring countries of Sudan, Kenya and DR Congo. These local and regional markets therefore could be exploited to earn the much needed income. Uganda has the most relatively good soils, cheap labor especially in the north and farmers who already have groundnuts as part of their culture making such a potential for income generation possible. A kilogram of groundnut grain on averages goes for Uganda shillings 2,000 higher than the world market prices of less than a dollar for the same weight. This means that it is even more lucrative to trade locally and regionally.

Location-specific advantage – 8.0

Northern Uganda is the largest producer and provider of groundnuts for the whole of Uganda. The north has relatively vast areas of fertile areas and sandy clay suitable for production of groundnuts. The agro-ecology and availability of cheap labor also favor groundnut production in the north leave alone the fact that groundnut production is considered part of the northern farming system right from West Nile through Acholi and Lango area up to Teso region (the whole north is suitable for groundnuts production).

Potential for increasing value and volume of marketed agricultural production from project areas – 7.0

The potential is high. Vast land exists in Northern and Eastern Uganda the major hub of groundnut production. The targeted agro-ecologies in the north are endowed with adequate and suitable land for groundnut production. The use of improved, acceptable groundnut varieties both for consumption and markets and application of good agronomic practices will ensure increase in groundnut production. Additionally, there is enormous demand for groundnut both locally and regionally. NARO is actively involved in development of varieties which will meet both consumer demand and markets. There are currently 4 commercial varieties (Serenut 1, 2, 3 and 4) widely grown in the north. In addition, more future varieties are being generated which is higher yielding with desirable attributes. Such a potential for value addition and increased volumes are therefore good. Additionally, consumption of groundnuts is 6 kg/person/year in Uganda, compared to 14 for all Sub-Sahara Africa (Sibusiso et al., 2007) with increasing domestic prices gives room and incentive for value and volume addition.

Potential for value addition, premium price capture and industrial use – 5.0

Most of the groundnuts are consumed locally however potential for value addition exists in peanut butter (groundnut paste), defatted groundnuts, blanched groundnuts, roasted and salted groundnuts, and coated groundnuts. Premium price can be captured when varieties are uniform in colour, sizes and free of impurities, breakages and aflotoxin. High prevalence of aflatoxin due to poor quality control has resulted into less export of groundnuts and capture of premium price. Quality improvements through adoption of improved post harvest handling can improve premium price capture (adoption and use of improved certified varieties, good crop management, adoption and use of post harvest technologies that limit damage to groundnut kennels, and improving storage and developing value chains that involve different actors along the given chains in production, market and business development). Sorting and grading is a practice that farmers and processors need training on. This will make the potential for value addition, premium price capture and industrial application move from the current medium to high.

Industrial applications or nonfood products such as soaps, medicines, cosmetics, and lubricants can be made from groundnuts. The vines with leaves are excellent high protein hay for livestock which can benefit zero grazing and intensive animal husbandry in Uganda although high presence of aflatoxins limit its use in the beef and dairy industries as aflatoxin has the ability to remain in meat and milk. The pods or shells serve as high fiber roughage in livestock feed, fuel (fireplace "logs"), mulch, and are used in manufacturing particle board.

Potential for private sector/producer linkages – 7.5

The potential for such a linkage is high especially in areas of value addition, seed production and industrial applications like in feed industry, confectionery, fortification with methionine, supplementary food for humans and oil extraction.

There is recognized participation of farmers/farmer groups (producers) in production of seeds (informal seed system) and grains in the value chain. The traders purchase the seeds and grains from producers to sell to the public. Seed companies are also part of the value chain. The formal and informal seed systems operate side-by-side; the informal seed sector is much more important, supplying bulk of the seed requirements for groundnut in the country. Support from government agencies, seed companies and non-governmental organizations are needed to create awareness about availability and potentials of improved varieties and good agronomic practices.

Potential for leveraging private and/or public sector investment – 6.0

Potential for leveraging private and/or public sector investment exists in the groundnut value chain (the development of niche products for specific purposes like confectionery, butter, oil, and animal feeds) but is not very much streamlined at the moment. Additionally there is leveraging in participatory varietal development where all the stakeholders are involved (Participatory Variety Development). Currently, NARO (variety development and dissemination), NAADS (advisory services), MAAIF (policy issues), seed companies (seed production and marketing), traders (marketing), transporters, and NGOs and CBOs (dissemination and capacity enhancement) are all to some limited extent investing in various aspects of the groundnut value chain.

Viability of integrating producers/farmer groups into value chains – 8.0

Farmers/farmer groups (producers) are the most actively involved in groundnut production. Farmers are involved in seed production (informal seed system) and on contractual arrangement with seed companies. Currently, the production and marketing is fragmented with middle men reaping a lot of profit from producers. Collective voice as in cooperatives could be beneficial in price setting, collective storage, acquisition of credits etc. Relationship with service providers, traders creates an opportunity for rural producers to increase production, improve quality and reduce cost of production

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.0

The potential for wider participation is high. Groundnut production and processing is mainly done mechanically by hand and mostly by smallholder farmers on small land holdings of less than 0.5 ha per household whose operations are mostly dominated by women and the vulnerable groups. Key labor demanding processes includes planting, weeding, harvesting, stripping, curing, shelling, sorting and value addition (roasting, butter making etc) are mostly carried out by women and the youth.

Groundnuts are the principal source of digestible protein, cooking oil and vitamins in northern Uganda with women frequently taking the lead in growing and managing the crop. Groundnut productivity has a significant bearing on the economic and nutritional well being of a large segment of the population in Uganda. Other groups involved in groundnut chain include retailers, wholesalers, supermarkets and institutions such as NARO, NAADS and district officials and consumers.

Potential for highest use of productive resources in the project areas – 7.0

The crop is grown all over the country for food and income. Northern and Eastern Uganda are however the major growing areas and the crop form part of their daily livelihood. Availability of large fertile areas, good climatic conditions and cheap labor guarantees best return to the use of available resources in the north and eastern Uganda. Use of project resources in areas of crop production, seed multiplication, quality and value addition (post harvest handling) will ensure greater return to investment and cause more impact on the lives of the people in targeted areas.

Potential for 'bankability' within a reasonable time frame – 2.0

The potential is very low for groundnuts. Producers are most likely to benefit less from access to commercial credits from microfinance or banks due to the nature of the credits and their repayment policies. Exporters and traders are more likely to access such credits although it has also not been easy. The formation of farmer groups may help take advantage of Warehouse Receipt System to improve quality and access to finance. The quality issues in groundnuts especially aflatoxin makes groundnut improvement and export a challenging venture.

Overall importance in Uganda's agricultural Economy – 5.0

Groundnut also known is the second most important legume after beans (*Phaseolus vulgaris L.*) in Uganda. The traditional groundnuts are of the red Valencia type, but of a very mixed nature. In 2005, Uganda produced 140,000 metric tons grown over a harvested area of 250,000 hectares with most of the crop being grown in the eastern and northern part of the country (Kaaya and Warren, 2005). Groundnut seeds

(kernels) contain 40-50% fat, 20-50 % protein and 10-20 % carbohydrate. With the costs of animal protein becoming increasingly prohibitive this crop is eventually gaining in importance. Groundnut seeds are also a nutritional source of vitamin E, niacin, falacin, calcium, phosphorus, magnesium, zinc, iron, riboflavin, thiamine and potassium. The kernels are consumed directly as raw, roasted, blanched, or crushed into paste, pounded and mixed with traditional dishes as a sauce or the paste is cooked on its own into *binyebwa*. It is a source of excellent oil for cooking and for salad. It is also used as animal feed. Nonfood products such as soaps, medicines, cosmetics, and lubricants can be made from groundnuts. The vines with leaves are excellent high protein hay for horses and ruminant livestock. The pods or shells serve as high fiber roughage in livestock feed, fuel (fireplace "logs") and mulch. As a legume, groundnuts improve soil fertility by fixing nitrogen and it generally requires few inputs, making it appropriate for cultivation in low-input agriculture by smallholding farmers. As a cash crop it gives relatively high returns for limited land area, and is well adapted to the hot, semi-arid conditions.

2.1.3.3 Soybeans

Market potential – 7.5

The market potential is high in the short, medium and long run. All the soybean processing plant in Uganda and Kenya wish to have collaboration with producers so as to acquire adequate raw materials. For example WhiteKnight group Limited is currently seeking 1,000 tons per month for processing food and extraction of oil. Currently, a lot of soybeans from Uganda go to Kenya and supply is far lower than demand at present giving opportunity for increased production.

Impact on food security – 4.0

The amount of soybean produced per year has increased from 1,000 tons in 1961 to the current 180,000 metric tons with an export value of over US Dollars 1,331 million (FAO). The increase in production has been due to a number of interventions by different stakeholders over time. Soybean is important for provision of protein and oil. The processing into other products such as baby foods has been excellent in supplementary feeding.

Potential for impact on incomes – 7.0

Soybean produces the highest amount of oil and protein per unit area as compared to other grain legumes. Using soybean varieties that are resistant to rust, there is gain of 1,000 extra kilograms of soybeans per hectare, leading to on-farm income from soybean alone of 850,000 shilling per hectare per year in a soybean-cereal rotation system. For example while the cost of production for soybean in Uganda is 168 – 184 US dollars per ton (exchange rate at 1700 = 1 US$), the US producer prices were US $ 160 – 170 in the last five years. This compares very well with the Ugandan figures and suggests favorable conditions for soybean production in Uganda. Moreover, production in the US is based on better varieties, adequate input utilization and better crop husbandry practices.

Location specific advantage – 8.0

Uganda is third largest producer of soybean after Nigeria and South Africa suggesting that all countries in the region look up to Uganda for soybean supply. There is good production environment for soybean in eastern (Kamuli, Pallisa, Iganga and Tororo

districts) and northern (Lira and Apac districts) Uganda. Other parts of northern Uganda also have suitable agro-ecological environment for production of soybean. Availability of land and labour and good growing conditions make the north and east suitable for production of the soybeans. Soybeans fit well in the northern and eastern farming system where they are intercropped with cereals, roots and tubers.

Potential for increasing value and volume and volume of marketed agricultural production from project areas – 7.5

Soybean has a high seed multiplication factor and farmers will easily get adequate seed for planting in a focused production system. The yield of soybean ranges from 1.5-3 tons per hectare depending on crop management. Extending production of soybeans to vast areas of northern Uganda where there is cheap labor and IDP being resettled, there is great opportunity to increase volume produced and marketed. Similarly, the use of high yielding pest and disease resistant varieties and good agronomic practices should result in increased marketed volume both in the north and eastern Uganda. High demand in the regional markets should be an incentive to increase value and volume of marketed soybeans. LEAD need to invest in enhancing skills and knowledge of producers in production, marketing, value addition and availing the required breeder and foundation seeds and improved agronomic practices to producers. The potential for increasing value and volume is high.

Potential for value addition, premium price capture and industrial use – 6.5

The potential is medium to high. A number of firms are involved in soybean processing and utilization including the following for human food processing, namely East Africa Basic Foods, Kayebe Source Packers, SESACO, Maganjo Grain Millers and MARITAS Foods Limited. And animal feed processing plants include Formula Feeds Limited, NUVITA in Jinja, UGACHICK Poultry Peeds and Biyinzika. Seed companies involved in seed production and marketing include FICA Seeds Limited, Victoria Seeds Limited, OTIS Garden Seed in Lira and Mukwano Group of Industries. These sectors add value to soybean and attracts premium price which may not necessary translate to income received by producers, the farmers. It is unfortunate that value addition and soybean utilization at farm level is very low.

Soybean is a key ingredient in livestock feed rations, and can thus support development of livestock industry in the country. Moreover, when included in rotations with cereals, it breaks down the build-up of pests and diseases and improves soil structure and soil moisture retention capacity. These aspects make soybean an ideal crop for commercialization of Agriculture in Uganda. Among the newest soybean uses is the soybean Bio-diesel; a high-lubricating, clean burning fuel for diesel engines. Therefore potential for premium capture is high if value addition and use of improved varieties and agronomic practices are carried out.

Potential for private sector/producer linkages – 7.5

The potential is high. Soybean value chain involves a number of private sectors who are linked to the producers. Seed companies contract farmers (producers) to produce soybean seeds. Farmers produce grains which are sold to food and feed processors. The food and feed processors purchase soybean produced by producers to add value (production of food and feeds). Grains produced by farmers are also sold to traders

and exporters. The potential for private sector-producer linkages is high. LEAD should support linkages and ensure that production and marketing processes are sustainable.

Potential for leveraging private and/or public sector investment – 6.0

NARO, MAAIF, NAADS and Makerere University are investing in research and promotion of soybeans. Producers have invested in production while food and feed processors invest in value addition. Seed companies have invested in production of the required seeds for production. Traders and exporters invest in purchase and marketing of the seeds. There is potential for leverage of private/public sector investment in soybean sector if production and marketing can well linked. At the moment, the potential is medium to high.

Viability of integrating farmers/groups into value chains – 8.0

There are already groups in Uganda producing soybean for specified market such as Bala Women and Youth Association (Apac District in northern Uganda) in collaboration with Formula feeds limited, and Zirobwe farmers association with East African basic foods limited and several others which are increasing seed so as to link with end users. Farmers/producers are suppliers of grains to traders, food and feed processors and exporters. They also produce seeds on contractual bases for seed companies. The producers are already involved in the value chain but require support to enhance their skills and knowledge in production, value addition and utilization and marketing of soybeans. Integration of farmers/farmer groups is highly viable.

Potential for participation by a wide range of beneficiaries, including women and vulnerable group – 7.5

Soybean is a miracle crop of many uses. Soybean production system has the capacity to contribute positively to many beneficiaries along the following area: 1) better incomes to farmers/producers, 2) better incomes to processors due to available raw materials, 3) better fish and poultry produced due to better feeds, and 4) better soil properties (structure and fertility) benefiting the crop in rotation such as cereals (increased yields). As mentioned above, many of the farmer groups involved in soybean production are women and youth. Other beneficiaries include NGOs/CBOs, NARO, NAADS and consumers.

Potential for highest use of productive resources in project areas – 7.0

Available land resources, good production environment and labour resources and use of high yielding varieties resistant to pests and diseases allows for increase in production and profitable use of resources. Such high efficiency of use of productive resources can be attained in northern and eastern Uganda where the environmental conditions deem fit.

Potential for bankability within a reasonable timeframe – 2.0

The potential for bankability for soybean at the moment is low but expected to improve with improvement in value addition and utilization at farm level and across communities. The fact that soybean is produced twice a year and has short maturity period with good market assures producers and processors and value chain actors of quick return over a relatively short period of time. As for the other crops, producers are in most cases not beneficiaries of financial access through loans or credits. Processors and traders may benefit more than producers.

Over all importance in Uganda's Agricultural Economy – 5.0

Soybean is third most important legume after beans and groundnuts' by volume of production but second after beans in terms export earnings. It has many industrial uses providing employment to many in Uganda.

2.1.4 ROOT AND TUBER CROPS

Root and tuber crops include cassava and sweet potato. These two crops are widely grown in Uganda and are considered staple crops after banana. According to the criteria used, cassava was much highly scored (109 or 77.9% or 2nd overall ranking position) compared to sweet potato (103 or 73.6% or 6th overall ranking position) but both are ranked much highly compared to other commodities. Details for the two crops are as below.

2.1.4.1 Cassava

Market Potential – 8.0

Cassava has moderate market potential in the short run with increasing importance with time when scaled out in the medium and long term. It has high to very high potential, respectively, in domestic, regional and international markets. However, domestic markets present a much higher potential than regional and international markets. This is because in domestic markets, the products demanded range from fresh roots (including leaves) to processed products while regional and international markets hinge around high value processed products.

Impact on Food Security and Incomes (Food security – 8.5; Income – 7.5)

Cassava has been playing a leading role as a food security crop in Uganda since its introduction. Cassava is the second most important starchy staple food crop after banana and major source of food to majority of the rural based households especially in the northern, northeastern and northwestern Uganda. This significant role has advanced beyond food security and has attained the status of income generating crop in the country. This is useful due to the fact that majority of farmers in the country are rural based and rely mainly on cassava as main source of food and incomes. Cassava is widely cultivated in the north because they store well and can withstand extreme weather conditions. The stems are in high demand especially the disease resistant ones (African cassava mosaic virus/ACMV and cassava brown streak disease/CBSD) and earn farmer income. It is glaringly clear that the role of cassava as an industrial crop is growing particularly in the field of pharmaceuticals, textiles, animal feeds and ply wood in Uganda with increasing importance in breweries and starch products.

Location Specific Advantage – 8.0

Cassava is widely grown in Uganda except the highland areas of south-western and eastern part of the country. However, it has been performing relatively better in the greater north than in the central and western Uganda. It therefore serves as a key commodity in food security and source of income mainly in the greater north with increasing importance in central and north-western Uganda. Many farmer groups/producer organizations in the north produce cassava. The agro-ecological environment in the north encourages production of cassava with vast amount of low-lying land, cheap labor and easy management and production. Ready market in DRC and southern Sudan is an added advantage to production of cassava in the north.

Potential for Increasing Value, Volume of Marketed Products, Value addition, Premium Price and industrial Use (Value and volume – 8.0; Value addition and premium price capture – 7.5)

The potential for value addition, premium price capture and increase of volume of marketed product is high. In recent past, attempts have been made by formal public and private institutions and cottage industries to add value and volume of marketed products to cassava. Such products include sun-dried cassava chips for longer storage and consumption and marketing during long dry spell, gari (cassava flour), potent gin (waragi), starch, high fructose and maltose in breweries, glucose and sucrose in pharmaceuticals and bakeries. There is also eminent potential role cassava is going to play in recent time in the bio-fuel production considering global energy crisis. The premium price may not necessarily be translated to cash earned by the farmers rather benefit more the processors. The use of improved high yielding cassava varieties resistant to pests and diseases and application of improved agronomic practices and enhanced farmer skills and knowledge in production and marketing can result in increased value and volume of marketed cassava products.

Potential for Private Sector/Producer Linkages (7.5) and Public Sector Investment (8.0)

The potential for private/producer sector linkage and investments are high. The strength and the striking successes in cassava research and development have been premised on the public-private sector/producer linkages. Largely the investments accrued from public, private and community based organizations (CBOs). This will continue to be one of the key strengths and strategies in cassava research and development if the crop is to spur development in Uganda. This key role of cassava in development has already been recognized by NEPAD and African governments are beginning to commit funds in cassava research and development.

Other sectors heavily involved in investment in cassava research and development include NARO (development of acceptable varieties and agronomic practices), NAADS for advisory services, MAAIF (policy issues), NGOs and CBOs (BUGADEV, VEDCO, SG 2000), feed and food processors, transporters, agro-inputs dealers and producers. There is need to support the producer/private sector linkages to maintain sustainability and increased production and income generation.

Viability of Integrating Producers/Farmer groups into value chain – 8.5

The roles of all end users of cassava along the value chain have been strategically recognized in the recent past in Uganda. A series of strategies have been adopted for all stakeholders to operate in a participatory manner along cassava value chain. A notable strategy has been National Network for Cassava Workers (NANEC). This stimulated production and increased productivity of cassava in the country by joint actions of all stakeholders from production to consumption through marketing in Uganda. Integration of producers/farmer groups in value chain remains a viable option in cassava value chain.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.5

Participation of a wide range of stakeholders in cassava value chain has been the reason for wider adoption and impact of cassava research and development on the livelihoods of the people of Uganda. Cassava is predominately produced by small scale farmers and participation of women and youth predominates in the production. A series of strategies have been adopted for all stakeholders to operate in a participatory manner along cassava value change. A notable strategy has been National Network for Cassava Workers (NANEC) a range of participants namely producers/farmers/farmer groups, traders, processors, transporters, the consumers and donors. Certainly, women and vulnerable groups have been considered and participating actively along cassava value chain. LEAD should get means and ways of involving a wide range of stakeholders and beneficiaries and maintains cohesion.

Use of Productive Resources in Project areas - 8.5

Land, labor and capital have been effectively utilized in the production of cassava in Uganda. This is particularly prominent in the greater north of Uganda where land, labor and capital have been allocated to the production of the crop. With the increased economic importance and industrial use of cassava in Uganda, farmers in these areas will continue to invest heavily on the use of land, labor and capital. It is also possible that the managerial ability/entrepreneurship will be invested in cassava production in the country. This is likely to improve and increase on the bank ability of cassava in the country in a very near future. Otherwise both the north and south are potential for production of cassava with the north having an over edge advantage than the rest of the country.

Potential for "bankability" within a reasonable timeframe - 3.0

Current potential is low to Medium but expected to improve with time. Cassava has a gestation period of 12 months after which return to cassava is realized. Due to its bulk nature and the use of large areas, the return to cassava is usually high per unit area. With increasing industrial use of cassava in Uganda, bankability of cassava is expected to improve and increase. Processors and machine fabricators may be able to access financial assistance or credit from financial institutions. Availability of markets and domestic demand may in the long run require more investment in production so improved access to credits by producers although current microfinance lending does not favor producers. Warehouse receipts may improve access to finance by producers.

Overall Importance of Cassava in Agricultural Economy - 7.5

Cassava is still the key starchy commodity after banana but a major in the north. Cassava remains an important food and income security crop. Given the fact that the productivity and production of a key commodity (bananas) in Uganda is on the decline due to biotic and abiotic problems, cassava remains a major commodity in contributing to improved agricultural economy in Uganda. This is within the premise that there is increasing climatic change and degrading environment, particularly drought and declining soil fertility that do not favor most crop commodities. Cassava will strive well under these adverse conditions because of its versatile and flexibility in the cropping and food systems in Uganda.

2.1.4.2 Sweet Potatoes

Market potential – 7.5

Market potential is medium to high (very high in the domestic market with increasing importance in the export market). Uganda is the leading producer of sweet potatoes in Africa, and second only to China in the world. Annual output is estimated at 2.6 million MT from 578,000 hectares (FAOSTAT, 2009). Production area has more than doubled between 1980 and 2007 from 231,000 to nearly 580,000 ha. Wanda *et al*. (2005) noted that the value of fresh sweet potato roots traded domestically was about US $ 60 million per annum in 2002. The market volume for chips in 2003 was estimated at over 120 MT per annum (worth about US $ 12,000) (Wanda *et al*., 2005). This has increased the utilization base in addition to creating opportunities for value addition through processing.

In 2003, the export volume for fresh sweet potato (mainly to the EU) was estimated at about 12 MT per month (about US $ 400,000) (Wanda *et al*., 2005). PRAPACE (2008) reported that Horticultural Exporters Association (HORTEXA) of Uganda exported over 550 MT in 2006 to Europe, and noted that this market offers the highest return per unit, in that it fetches twice more income than the domestic market. However, Wanda *et al*. (2005) noted that considerable efforts would be required to realize this potential as this market has stringent quality standards.

Although the fresh sweet potato market constitutes the largest marketing outlet, new ones are slowly emerging due to the development of new or improved products by CIP/PRAPACE, NARO and private sector partnerships.

Impact on food security – 8.5

Sweet potato is the third most important starchy staple food crop after banana (*Musa* sp.) and cassava (*Manihot esculenta* Crantz). The crop ranks second after banana in western and central regions, and second to finger millet (*Eleusine corocana* L.) in northern and eastern regions (Bashasha et al 1995). It is widely cultivated and evenly spread of all major food crops because they store well in the soil, withstand extreme weather conditions (drought), have short growth period (3-6 months) and yield well with limited inputs on relatively marginal soils (Woolfe 1992; Bashasha et al 1995).

Predominantly grown in small plots by resource-poor farmers and women predominate in its production. The crop is a famine security crop, important in years of disaster when other crops fail. It is more important as a food in low-income households, and for marginal groups within households (especially in the north-eastern, central and south-eastern regions) (CIP 1991). Compared to many other crops, sweet potato requires few inputs and relatively less labor, making it particularly suitable for households threatened by migration, civil disorder or diseases such as HIV/AIDS (Jayne *et al*. 2004, cited by CIP 2009).

The varieties grown by farmers are predominantly white- and cream-fleshed types, which are very deficient in beta-carotene, the precursor of vitamin A. The orange-fleshed sweet potato (OFSP) types contain high levels of beta-carotene, which the body converts into vitamin A to boost its immune system. Vitamin A deficiency (VAD) is one of the most serious health and nutritional problems of sub-Saharan Africa (SSA). It is estimated that 30-50% of Uganda population consume orange flesh sweet potato.

Potential for Impact on incomes – 7.0

The crop has become an important source of household income, especially to the marginalized groups such as women and youths, despite the relatively low yields at

the farm level. Field survey findings from eastern Uganda (Iganga and Kumi districts) indicate that farmers can earn between US $ 300-500 per ha per annum as net profits (i.e., net margin 67 - 72 % of cost) (Wanda *et al*. 2005). Partial budget analysis of sweet potato enterprise showed that farmers could get profit ranging from US $ 23.9 (Mpigi) to US $ 100.5 (Kumi) per acre per season from sale of fresh sweet potato roots (Odongo *et al*. 2003). Planting material, especially of OFSP, has very good market and can significantly boost farmers' income.

Results of a Cost/Benefit Analysis conducted by PRAPACE (2005) in central Uganda (Luwero, Mpigi and Mukono districts) show that sweet potato production is a financially viable enterprise with regard to commercial production of roots, vines, storage technologies, flour and snacks, except for commercial juice production and chip making. For every Uganda Shilling invested in the production of roots, farmers can obtain Uganda shillings 1.5 - 2.1 from sale in local markets. Commercial vine production is viable, resulting into Uganda shillings 1.6 – 2.4 for every Shilling invested. Investing in processing roots into flour earned Uganda shillings 1.1 – 3.7 for every shilling invested, while snack production resulted into a gain of Uganda shillings 1.1 for every Shilling invested. Investment in storage structures is also worthwhile in that for every shilling invested farmers can obtain Uganda shillings 12.7 – 15.9. Commercial production of chips and juice is unviable (at 13 % discount rate), largely due to large capital outlays required for production in a three-year period (PRAPACE, 2005). Such investments may be worthwhile over a longer period of project life and a lower discount rate.

Location-Specific Advantage – 7.5

Sweet potato is widely cultivated and evenly spread of all major food crops because they store well in the soil, withstand extreme weather conditions (drought), have short growth period (3-6 months) and yield well with limited inputs on relatively marginal soils. There is high production of orange flesh sweet potato in eastern and northern Uganda. Other sweet potato varieties perform generally well across the country except the highland areas where adaptable varieties are not available. Availability of land, suitable environmental conditions and cheap labor in the north is an added advantage for extension of sweet potato production in Uganda.

Potential for increasing Value and Volume of marketed Production from Project Areas – 7.5

Sweet potato's ability to produce relatively good yields under marginal conditions, its flexible planting and harvesting times, and its good yield response to better management are factors driving its expansion in sub-Saharan Africa (SSA) in general (Woolfe 1992) and Uganda, in particular. Other factors include outbreak of pests and diseases of cassava (especially African Cassava Mosaic Virus Disease) and bananas during the early 1990s. Sweet potato yields on-farm can be increased if planting material of improved varieties and proper agronomic/management practices are availed to farmers. Based on results reported earlier, the sweet potato enterprise offers an opportunity for increased farm incomes, particularly when farmers are trained in integrated production and pest management (IPPM), rapid multiplication technique (RMT) of planting material (vines), processing and storage plus enterprise development. Increasing the product base has been an incentive to increase production (value and volume of marketed products).

In order to fully exploit the export market potential, considerable efforts are required in terms of training farmers in agronomy and post-harvest handling of sweet potato, so as to meet the stringent quality standards set by the EU (EUREGAP). But the potential is relatively high.

Potential for Value Addition, Premium Capture, Processing and industrial Use – 7.0

The long dry season in northern and north-eastern parts of the country and accompanying weevil (*Cylas* spp.) infestations, have led farmers to develop sun-dried products, such as *amukeke* (dry-sliced form) and *inginyo* (dry chunk form). The dried chips are stored for home consumption during the long dry spell. This market has a potential to grow through various recipes by the private sector including flour, feed, starch and high-value snack foods. One example is the development of an improved product known as *nutri-porridge* in Uganda that was developed by CIP/PRAPACE and Kawanda Agricultural Research Institute (KARI) of NARO. This is a composite product made from maize, groundnuts and sweet potato in a 3:1: 1 ratio. It offers unique market opportunities for value addition through processing.

Other value added products involves processing of OFSP into chips, composite flours, juice, confectionaries and herbal soap. The potential for premium price capture through value addition and industrial use is high.

Potential for Private sector/producer linkages (7.5) and leveraging private and public sector investments (7.0)

The potential is very high in the sweet potato value chain. The following private sectors are actors in the sweet potato value chain: **(i) Kasawo Grain Millers Limited** in Natete, Kampala, produces composite flour (maize, soybean, sweet potato) that is popular in local and super markets. Their requirement by 2003 was 1 ton per month of dry orange-fleshed sweet potato (OFSP, vitamin A-rich) chips, and was expected to increase considerably when their market area increases. **(ii) Maganjo Grain Millers Ltd**. in Kagoma, Kampala, produces and markets composite flours and weaning foods that have OFSP flour as an ingredient. OFSP is used as a partial substitute for imported wheat in a large number of bakery and pastry products. Maganjo targets both domestic and export markets. **(iii) Ugachick Poultry Breeders Ltd**. conducted trials to use OFSP flour in their chicken feed. The monthly requirement of her animal feed processing mill is about 80 MT of dried sweet potato. **(iv) HORTEXA** (Horticultural Exporters Association) exports spices and sweet potato (OFSP inclusive) to Europe. (v) **TONET** near Kalerwe market, Kampala, fabricates farm tools and equipment, such as chipping machines, to reduce human drudgery on-farm when slicing sweet potato manually using kitchen knives. All these companies purchase their sweet potato from producers providing producers with the markets they require for sweet potato. There is need to support the producer/private sector linkages to maintain sustainability and increased production and income generation

Similarly, these private sectors have over the years invested heavily in sweet potato processing to produce value added foods and feeds. Others who have invested in sweet potato includes NARO (production of the required varieties and improved agronomic practices, and dissemination of sweet potato-based technologies); NAADS in advisory services and dissemination of technologies; MAAIF (policy issues); NGOs

(BUGADEV, SG 2000, VEDCO); CBOs; transporters; vine producers who are mostly farmers; and Makerere University as partners in research with NaCRRI. There is need to invest in both public and private sector activities to increase value and volume premium price capture and income

Viability of integrating producers/farmer groups into Value Chains – 7.5

Individual farmers and farmer groups are part of sweet potato value chain. They produce the sweet potato vines for planting as no seed company is producing the vines and at the same time produce the roots for sale to traders and consumers. Farmers need to be organized into cooperative groups for collective bargaining when marketing sweet potato and its products, purchasing farm inputs and sourcing financial assistance. There is need for researchers, policy makers and NGOs and other development partners such as LEAD to facilitate round-table meetings for all key players in the value chain, namely farmers, traders, processors, tools/equipment fabricators and credit institutions. During such meetings, business memorandum of understanding (MoUs) or Agreements can be written and signed, so that all parties get a fair deal from the linkages. The NANEC system of cassava can easily be applied to sweet potato. Therefore the producer integration in the value chain is a viable option.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.5

Sweet potato value chain involves a wide range of beneficiaries. Sweet potato is predominantly produced by small scale farmers. Women and youth predominates sweet potato production. Other beneficiaries involved in sweet potato value chain include consumers, traders, processors, input suppliers, machine fabricators and transporters. Orange flesh sweet potato which contains high level of beta-carotene, which the body converts into vitamin A to boost its immune system are available. Vulnerable groups with health problems such as HIV and vitamin A deficiency have been included in the value chain. Due to ease of production, sweet potato has been suitable for households threatened by migration, civil disorder or diseases such as HIV/AIDS. The potential for wide range of participation of beneficiaries is high.

Potential for highest use of productive resources in project areas – 8.0

Cost/benefit analysis across Uganda has indicated sweet potato to be a viable financial enterprise both in the south and north. The easy export to EU markets from the south for sweet potato can be used as a target to procure sweet potato from the north for export if other logistics are in place. Availability of large areas of land, cheap labor and light soils, high demand domestically and in Sudan and availability of vulnerable groups such as IPD in the north gives the north an edge advantage over the south. But in general, both north and south are suitable for sweet potato cultivation with equal importance in central and western Uganda.

Potential for "bankability" within a reasonable timeframe - 2.5

The potential is low to medium depending on the chain actor. With increasing industrial use of sweet potato, processors and machine fabricators may be able to access financial assistance or credit from financial institutions more easily.

Availability of markets and domestic demand may in the long run require more investment in production so access to credits by producers although current microfinance lending do not favor producers. Warehouse receipts may improve access to finance by producers.

Overall importance in Uganda's agricultural economy – 7.0

As noted earlier, Uganda is the leading producer of sweet potatoes in Africa, and second only to China in the world. Annual output is estimated at 2.6 million MT from 578,000 hectares. An estimated value of fresh sweet potato roots traded domestically was about US $ 60 million per annum in 2002 and the market volume for chips in 2003 was estimated at over 120 MT per annum (worth about US $ 12,000). This has increased the utilization base in addition to creating opportunities for value addition through processing.

Sweet potato is the third most important starchy food crop after banana and cassava and very important for food security, nutrition and health security and income generation. It is very important as a food in low income households. In 2003, the export volume for fresh sweet potato (mainly to the EU) was estimated at about 12 MT per month (about US $ 400,000). Horticultural Exporters Association (HORTEXA) of Uganda exported over 550 MT in 2006 to Europe, and earned the highest return per unit, in that it fetches twice more income than the domestic market.

2.2 COFFEE

The most highly ranked commodity (fist overall ranking position) compared to others (score of 110 or 78.6%). The details are as given below.

Market potential – 9.0

Coffee is the most traded commodity worldwide to the tune of more than US $ 90 million only and second to oil trade. International demand for coffee is projected to increase to the tune of more than 140 million bags (60 Kgs each) from the current 120 million bags. Therefore, market potential for coffee is high and the long-term prospect for coffee expansion in Uganda is very good. Almost all the coffee produced by coffee farmers in Uganda currently is sold to buyers, mostly processors, or their agents commonly called middlemen. Negligible quantities of the coffee are processed on-farm for domestic consumption. Therefore, there is very high demand in the domestic, regional and international markets. Within the African region, Sudan is an important destination for Uganda's coffee, the country importing about one third of Uganda's total coffee out-put. The volume in export to the Sudan will continue to increase as normalcy returns to the hitherto strife torn country, particularly the southern region. On the international scene, Uganda is ranked 9th among the top most coffee exporting countries of the world and 2nd in Africa after Ethiopia. Owing to it's reputation for producing the finest Robusta coffee brand that is used for blending Arabica coffee from other countries by the world's top-most coffee blenders such as Nescafe, Illycafe and Starbucks, the market demand for Uganda's Robusta coffee that is produced predominantly in the central and southern parts of the country, will for time to come remain high and unchallenged. In the short to medium

term therefore, the market potential of Uganda's coffee is very high. In the long-term however, competition from emerging high volume Robusta coffee producers such as Vietnam and other new entrants, might subsequently lead to reduced market share of Uganda's coffee in the international market. This accompanied by declining volumes due to diverse factors such as the coffee wilt disease (CWD), insect pests and declining soil fertility might lead to Uganda producing decreasing volumes that will overtime become uncompetitive in the world market. Uganda's estimated income from coffee stood at USD 642 million per year although due to named above factors, Uganda only earned USD 257 million in 2007. Coffee still remains a leading foreign exchange earner.

Impact on food security – 2.5

While coffee is produced by farmers principally for the market, the crop has a bearing on the farm-house-hold income, and indirectly on the national food security situation. The intercession of a high value cash crop such as coffee diversifies the source of income for farm families to meet most of their cash needs away from proceeds of the sales of food crops, hence promoting farm-house-hold food security. In situations of failed yields of food crops due to failed weather and other unforeseeable calamities, proceeds from coffee sales can be used to procure food for the families. In addition, cash from coffee sales is used to buy food supplements which are not specifically produced by the individual farmers. Therefore, coffee improves the purchasing power of the producers to empower them meet other household needs indirectly improving on food security.

Potential for impact on incomes – 9.0

Coffee being a high value perennial crop, its potential for improved household incomes for farmers in central and southern Uganda is very high. It is estimated that about 500,000 small holders grow coffee in Uganda and meet their livelihoods from coffee. Competitively, the income per unit area per annum of coffee is much higher than for most other crops grown in the region, other factors being constant. (It should also be noted that Uganda's Rubusta coffee can receive highest premium worldwide and the current market price trend for coffee is very good. This is in addition to the fact that coffee is generally a low in-put perennial crop that requires much less expertise than other crops such as tea, flowers, etc. In the event of extreme climatic conditions that will often lead to total crop failure in other crops, coffee will always still give considerable yield, thereby ensuring at least some income for the affected farm-house-holds. Due to a well established marketing infrastructure, coffee has a comparative advantage over most other crops since the harvest will always be assured of a ready market. This, in addition to the fact that coffee is easier to store and handle in the dry form (locally called "Kiboko") and ensures minimal losses to the harvest.

Location-specific advantages – 9.0

Much of central and southern parts of Uganda are located within agro-ecological zones that are characterized by high and well distributed rainfalls, high temperatures and humidity, deep well drained soils. These are very good conditions for the production of Robusta coffee. Further to this, the location of political and commercial epicenters of the country within the central region and proximal to the southern region come with obvious advantages in the physical and financial, and institutional

infrastructures, and access to services that drives the coffee industry. Therefore, central and southern Uganda becomes very ideal for production of coffee in Uganda. Arabica coffee on the other hand performs well in the highlands of West Nile (Nebbi District), eastern highlands (Sironko, Mbale and Kapchorwa districts) and the western highlands.

Potential for increasing value and volume of marketed agricultural production – 8.0

The potential for increasing the value of the marketed coffee is high and lies in the production of high quality coffee and value addition. Specialty coffees of various descriptions are preferred by niches in America, Europe and Asia. These are easily attainable through the requisite research and policy inputs. Due to devastation of Robusta coffee by the coffee wilt disease in Central and Southern Uganda, coffee production has for a long time continued to decline. However, it is important to reverse this decline if Uganda is to maintain its export share on the world market.

The current farm productivity level is less than one third of that at research stations, mainly due to lack of adoption of recommended production technologies. At the current acreage cover, coffee production in central and southern Uganda could triple with the adoption the appropriate coffee wilt resistant disease (CWD) varieties, pests and disease management practices, soil and canopy management practices, and proper post harvest handling and processing recommendations. The good current price trend is an incentive to increased production of coffee. Higher price of processed coffee with available opportunity to process coffee gives an added incentive for increased value of marketed coffee.

Potential for value addition, premium price capture and industrial use – 8.0

Much of the coffee produced in Uganda is marketed in the unprocessed form, and therefore low-valued. Value addition can be achieved by processing the coffee into ground roasted coffee or instant coffee prior to marketing which will definitely improve on quality and premium price paid for the products. At the moment, only a few coffee shops operate in Uganda and one company processes a brand of instant coffee called "Star coffee". This is one of the aspects of improving the Uganda coffee industry whose potentials remain unexploited and very high. Proper post harvest handling can also improve premium price capture noting that there is high demand for Uganda Robusta coffee.

Potential for private sector/producer linkages – 8.0

The potential for private sector/producer partnerships in the coffee industry in the central and southern region is high and yet largely un-exploited. The following are areas where linkages between private sector and producers have the highest potential: (a) Multiplication and distribution of improved coffee planting materials to meet national needs by nursery operators and private tissue culture laboratories; (b) Soil fertility and pest management in terms of provision of fertilizers and pesticides and, the development of integrated pest and disease management practices to optimize production by agro-input or chemical dealers such as BALTON, TWIGA, CIBA and GEIGY; (c) Commercialization of specialized technologies such as diagnostics kits for pests and diseases, traps and other kits by private sectors (manufacturers); (d) Value addition and development of by-products (processors and manufacturers); (e) National planning and policy analysis aimed at developing coffee based commercial

products to meet global needs (Manufacturers and CBOs/CSOs); (f) Capacity building through trainings and exchange visits by the private Universities, research establishments {national agricultural research systems (NARS) and international agricultural research services (IARS)}.

The high demand exceeding supply with high market potential clearly makes coffee value chain an attractive private sector/producer linkage. LEAD should maintain close linkage and collaboration with private sector (producers, processors, manufacturers, agro-input dealers, NGOs, CBOs, Civil Society Organizations/CSO) and public sectors (NARO/COREC, Uganda Coffee Development Authority/UCDA) in pursuit of improving coffee production and export in Uganda.

Potential for leveraging private and/or public sector investment – 6.0

Because of its marketability and plantation nature, coffee is the crop that can easily attract multinational companies engaged in its large scale production, processing and marketing. The current production chains are dominated by the small holder farmers with less than 1.5 ha in size and are unable to sustain Uganda competitively. With high production capacity, it would be easier to attract investors to invest in the coffee industry. At the moment, there is low to medium private sector investment in the coffee value chain. Private sectors are expected to invest in the various areas of the value chain including seedling provision, agro-inputs, capacity enhancement, processing and marketing. A number of private sectors are willing to invest in production, processing, and marketing so long as coffee price remains promising and disease (CWD) resistant varieties are available to farmers.

Viability of integrating producers/farmer groups into value chains – 9.0

Being a crop of commerce, the integration of the producers/farmer groups in coffee value chain is a requisite for sustainable production of the crop, increased volume and quality which is attractive to private sector investment. This is possible through a concerted commercialization and formation of producer organizations (cooperatives) for production and marketing and taking advantage of the warehouse receipt system. It should be noted that even before the current liberalization policy, coffee marketing was being done through cooperative societies and these were crucial in maintaining high product quality in the coffee chain. Capacity enhancement of the unskilled smallholder farmers makes it possible for them to be linked to various markets.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 8.0

The potential for a wider participation by beneficiaries is high. A gender analysis of coffee production disaggregating the various activities undertaken in the coffee production process during a coffee season calendar, undertaken with farmer groups in Rakai and Masaka under the APEP coffee commercialization program, found out that the bulk of coffee production activities are performed by women and children. Sustainable coffee production therefore necessitates a greater involvement of the women and children in such aspects as training and decision making. Many farmer organizations are increasing consciousness of this necessity and women participation in household decision making and leadership of farmer organizations have continued to improve and therefore their greater participation has always been advocated for. The involvement of producers, processors and traders are essential in the coffee value chain.

Potential for highest use of productive resources in project areas – 8.5

The most critical production resources in the central and southern parts of Uganda are land and labor. The coffee industry pre-occupies well over 80% of the rural labor folk in central and southern Uganda. This is also reflected in the amount of land, a cardinal resource in this region that is allocated to coffee growing in the region. In addition, many other folks, both rural and urban, are in gainful employment along the coffee value-chain such as processing and marketing. Coffee in most cases is intercropped with other crops resulting in more efficient use of resources and return to land and avoidance of risks. The growth conditions in the south and availability of support services all favor coffee production. The expansion of coffee production in this region will automatically translate into increase labor requirement for the industry.

Potential for "Bankability" within reasonable timeframe – 5.5

Potential for bankability in the coffee value chain is currently low to medium but is expected to rice with improvement in value addition. Formation of cooperatives may facilitate access to loans and other financial assistance. Producers can also take advantage of the warehouse receipts system. Because of its marketability and non-perishable nature under good storage conditions, coffee can be easily mortgaged for a loan in the bank. In this case, a farmer can easily deposit his coffee at the cooperative society and get a receipt which can be used for obtaining goods or services till the coffee is sold and he pays back the cash. The value equivalent of the coffee can be determined by the cooperative society depending on the current or predictable price and this can help the farmer to get the equivalent services.

Overall importance in Uganda's Agricultural Economy – 9.5

Coffee is of immense importance as a cash crop for Uganda as it accounts for significant proportions of the national foreign exchange earnings. In 2007, coffee contributed up to 66.6% of the total national foreign exchange earnings from traditional cash crops, and 19.9% of the total earnings from both traditional and non-traditional export commodities (Uganda Export Promotion Board/UEPB website, 2009). Coffee provides cash income to many smallholder farmers in Uganda. About 1.5 million families are in involved in various aspects of coffee production, processing and marketing.

2.3 COTTON

Total score for cotton was 94 (67.1%) earning it 8th overall ranking position. The details are as given below.

Market potential – 8.0

Market potential for cotton is high although minimal production is currently taking place. It is estimated that Uganda can produce up to 500,000 bales of cotton every year but the 2007 production was only 135,000 bales yet this can double with improvement in production practices and use of high yielding varieties with desirable lint qualities. There is great potential for cotton lint globally and in the eastern and southern African countries. Uganda cotton also has the potential to tap market from AGOA for textile, apparel and garments as well as tapping from European markets. Currently, there are large areas for investments in value addition, spinning, textile and garment manufacture, bio-diesel and extraction of edible oil and manufacture of

animal feeds from cotton byproducts. Opportunities also exist in investment in local industries for making blankets, mats, carpets, writing paper, toilet tissue, X-ray films, photographic films, upholstery padding, cotton wool and gauze. All these opportunities provide good ground for marketable products which are on high demand locally and regionally.

Impact on food security – 1.5

Cotton does not contribute directly to household food security but contributes to cash security which improves purchasing power of households resulting in improved food security. Cotton is an important cash crop and the income which it generates improves household purchasing power contributing to rural household food security (cash is used to acquire health care, more nutritious foods such as meat, milk, fruits and vegetables, clothing, housing and many other services).

Potential of Impact on incomes – 7.5

Cotton is Uganda's third largest export crop after coffee and tea and is the main source of income for some 250,000 – 300,000 low-income households who receive gross income of about Uganda Shillings 133,000= or US $ 70 (Baffes, 2009). Cotton is one major cash earner for smallholder farmers in the north and east. Cotton sector contributes directly to Uganda' export revenue, employment (rural employment in cotton ginning, transport, marketing and, in textile and clothing manufacture) and exports for its products (textile). The market for Uganda cotton is still good especially organic cotton. Farmers (producers) still think that income generated from cotton is more biased towards benefiting the middlemen and exporters than them the producers.

Location-specific advantage – 8.5

According to cotton development organization (CDO), cotton can be grown across two-thirds of Uganda with fertile soils, a suitable climate, favorable policies and a solid marketing structure. The most suitable production environment is the greater north right from West Nile through Acholi, Lango to Teso region. Availability of fertile land, cheap labor, suitable agro-ecologies and cotton's position in rotation favor cotton production in the north. There is also production of organic cotton in the north (Lango, Acholi and west Nile region) which has premium price capture in the World market. The management requirements for organic cotton and the price offered to producers need consideration. Cotton production is also possible in the east and western Uganda.

Potential for increasing value and volume of marketed agricultural production from project areas – 7.0

The potential for increasing value and volume is high if the correct agronomic practices, adaptable varieties and agro-inputs are used. Land productivity can be achieved by introducing new technologies such as improved varieties and integrated pest management. The smallholders largely depend on family labour and introduction

of animal traction and tractors not only for opening land but also for other operations like weeding and applying pesticides would encourage medium to large scale farmers. This is feasible for northern and some areas in eastern Uganda where the human population is moderate. The region produced 135,000 bales of cotton, up from the 120,000 produced the previous year yet the potential can go up to 500,000 bales annually. The low levels of productivity leave room for improvement.

Uganda is the only country in the world that grows one variety of cotton, the long-stapled Bukalasa Pedigree Albar (BPA). This focus on one type ensures uniformity and easier quality control measures in producing lint and yarn. Uganda is now well known internationally as a producer of high-quality organic cotton, which can be sold at a premium. One reason this is possible is the country's ability to produce large tonnage of organic cotton using natural predators and locally available botanical agents. There is also need to increase the number of certified organic cotton producers for increased value and volume.

The volume of cotton produce can be further increased by domestic consumption of cotton by expanding on processing (textile and soap manufacturing and oil millers) in regions where the cotton is produced.

Potential for value addition, premium price capture and industrial use – 7.0

Uganda's cotton sector is attracting substantial private investment since its liberalization. A doubling of ginning capacity between 1993 and 2001 reflects the renewed confidence in cotton production, while liberalization of the sector provided extra incentives for growers. Production of organic cotton which is on demand in the international markets will improve premium capture.

Further down the chain there are investment possibilities in increasing the ginning capacity to improve spinning as well as processing cotton to yarn or textiles before export, and also processing cotton seed into oil and byproducts for animal feed.

Most of Uganda's cotton is exported to Western Europe, but potential markets are developing elsewhere too. The United States of America (USA) market is an obvious possibility for growth, given Uganda's eligibility for benefits under the USA African Growth and Opportunity Act (AGOA), which provides improved access to the US market. Farmers' feeling though is that the middlemen and exporters get the premium price and not them. They feel more disadvantaged in financial equity.

Potential for private sector/producer linkages – 7.5

The potential for linkage is high and currently functional. Private sector/producer linkages comprise a number of actors including cotton farmers or farmer groups (key players primarily engaged in production); private companies engaged in production through farmer groups (BOWEEVIL based in Lira for organic cotton and DUNAVANT Uganda Limited based in Kampala with sub-stations in Nakasongola and the north working with over 10,000 farmers in northern Uganda mostly the internally displaced people (IDP)); cotton ginners (DUNAVANT Uganda Limited and Uganda Cooperative

Societies); transporters; manufacturers of textile such as Phonex Uganda Limited; and exporters. All these stakeholders in the cotton value chain are linked for better production, transportation, value addition and export of cotton products. With increased cotton production, these linkages in the areas of cotton seed production, provision of agro-inputs, capacity enhancement, and processing will be bolstered and strengthened. LAED should create conducive environment for involvement of many actors and enhance their capacities to maintain the established linkages and also create more sustainable linkages between producers and private sectors.

Potential for leveraging private and/or public sector investment – 5.5

Although there are many investment opportunities in the cotton value chain, at the moment the leverage potential is at medium level. There are many investment opportunities in the cotton industry in Uganda that can boost the participation of both private and public investors. There are opportunities for value addition to cotton in Uganda as 95% of Uganda cotton is exported in raw form yet spinning and integrated fabric manufacture can be undertaken to improve on the value. NARO is currently involved in development of improved varieties and agronomic practices and NAADS in advisory services while MAAIF in policy issues. Private sectors are investing in capacity enhancement, production and marketing of organic cotton (BOWEEVIL) and expansion of production, support to extension services and marketing of cotton (DUNAVANT). Other opportunities include investment in organic cotton production which fetches premium price in world market (potential of producing over 92,500 MT of organic cotton although currently producing only 1,100 MT are produced); investment in seed oil and animal feeds; investment in cotton production on commercial basis using irrigation and indirectly investing in production and marketing of Agro chemicals and equipments required in the cotton industry to boost production and add value.

Viability of integrating producers/farmer groups into value chains – 7.0

Integration of producers/farmer groups into the cotton value chain is possible at certain levels in the chain, provided issues of low level industrialization, and absence of weak intra-industry linkages are addressed. It is at medium level for organic cotton and high level for conventional cotton. It is estimated that about 300,000 smallholder farmers are involved in cotton production. Cotton is harvested from the plant inform of seed cotton and requires processing (ginning) to separate fiber (lint) from seed. Cotton ginneries in Uganda are purely dependent on the production and sale of cotton to them by producers. Ginning is a highly specialized process whereby the seed is separated from the cotton lint; the cotton is cleaned, and finally pressed into bales. Sometimes the producers sell and deliver their cotton directly to ginneries (about 38 ginneries in Uganda), and at other times, agents contracted as middlemen who transport cotton between the production site and ginnery. None of the ginneries produces their own cotton except through organized farmer groups such as DUNAVANT Uganda Limited. The total annual ginning capacity in Uganda is estimated at 61.6 million kg, which roughly translates into 40,000 tons of cotton seed and 21.5 million kg. Ginneries are required to sell 20% of all their seed to CDO for replanting. And the rest totaling about 32,000 tons is sold to oil mills for crushing.

Traditionally all cotton farmers belonged to local Cooperative Societies for purposes of input acquisition and marketing, and the Cooperative Societies in turn belonged to Cooperative Unions for purpose of capital investments that enabled processing and exporting cotton. The Farmer>Cooperative Society>Union system is still functional, though with minor modifications and changes in names of some components of the system, but is still ideal for cotton production. There is need to provide desired environment for integration and participation of producers/farmer groups in the cotton value chain

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 7.0

Small-scale farmers are the major producers of cotton in Uganda. In a household, everyone is involved. Men mainly do the bush clearing, ploughing and spraying. Men, women and children are all involved in planting, weeding, thinning, picking, sorting of the crop and transportation to the buying centers. Women and girls are more involved in collection of water for spraying.

Disability manifests itself in various ways, but a number of disabled people are and can be involved in cotton production. Lame and elderly people can sort cotton since it is a job done while sitting. Deaf ones are involved in the whole series of activities based on their gender roles.

Other beneficiaries involved include NARO, NAADS, agro-input dealers/stockiest, ginners, oil millers and feed manufacturers. Agro-input dealers sell the agro-chemicals and in collaboration with extension staffs advise farmers on how to apply these inputs. Ginners are traders in seed cotton were they buy seed cotton, gin, bale and export to regional and international countries. Oil millers are involved in extracting oil from cotton seed while textiles make various garments. In all, a wide range of stakeholders are involved in the cotton value chain. LAED should create an environment which support participation of a wide range of beneficiaries and maintain strong linkages among the beneficiaries.

Potential for highest use of productive resources in project areas – 5.0

Cotton is most produced in northern, north western and eastern Uganda where there are vast resources in form of fertile land, labor and generally well distributed rainfall throughout the growth period as required for cotton production. Potentially, the north, northwest and eastern Uganda would be where production resources would be effectively and economically utilized to increased cotton production.

In Uganda, soil fertility problem is becoming a key killer production constraint especially in North-Eastern and Eastern regions. Promoting the utilization of organic and inorganic fertilizers would encourage and enhance production and productivity of cotton and other accompanying crops to attract investors beyond cotton. Cotton is a crop that fits well in the northern farming system and can be intercropped with other crops. It should be noted that producers in the north and northeast feel that the price offered for cotton is not commensurate with the management required to produce cotton especially organic cotton. This lowers its potential for productive utilization of resources in project areas (medium).

Potential for "bankability" within a reasonable timeframe – 4.0
Potential for bankability is low to medium but can be improved with improvement in value and volume and value addition and processing. Producers can benefit more from the warehouse receipt system and also working with private sector such as BOWEEVIL and DUNAVANT by accessing financial assistance from them mostly in form of inputs for production. Areas where investors can access credit and finances are in processing (ginning/yarn production, textile manufacturers, oil and animals feed production) and other areas of value addition.

Overall importance in Uganda's agricultural economy – 8.5
For the last 3 decades, cotton was rated number one as Uganda's main export crop and therefore foreign exchange earner hence its reference to as "white gold". Today, cotton is ranked as the third important traditional export crop after coffee and tea and earning, US $ 19,571 from 16,230 tons of lint in 2007 (Uganda Export and Promotions Board, 2007).

Cotton exports brought in Uganda shillings 49 Billion this year compared to Uganda shillings 34 Billion the previous year due to increased production in eastern Uganda (Cotton Development Organization (CDO)).Cotton remains an important crop to the people of Uganda both from social and economic view points as it was grown in over 40 of the 80 administrative districts. It generates disposable cash income to farmers in rural settings and supports rural based industries where over 85% of the Ugandan population resides. It provides employment and source of raw material in the production of edible oils, soap, textiles, seed cake for feeding livestock among others.

Cotton is grown in rotation with other crops. Cotton is grown in rotation with food crops thus promoting food production by improving yields in subsequent crops by leaving well-prepared seedbed for cereals such as millet, sorghum, sesame, groundnuts and peas.

2.4 FISH (AQUACULTURE)

Total score for aquaculture was 92.5 (66.1%) earning it 10th overall ranking position. The details are as given below.

Market potential – 7.0
There is a high market potential for fish along the different chain segments. On domestic market, fish has in the past been regarded as a cheap source of animal protein. The trade involves fish in different forms with a large number of processors and traders supplying consumers directly or indirectly and in most cases the trade may be formal or informal. Most urban areas are high consumption centers, due to their purchasing power. Regionally there is a high demand for dry/smoked/salted tilapia, Nile perch and mukene as well as by-products from the fish factories such as fish frames, skins, oils and off-cuts in Rwanda, Democratic Republic of Congo (DRC),

Southern Sudan and Kenya. Regional fish export is estimated at US $ 30 million annually.
International fish export, consisting mainly of chilled Nile perch fillets as well as frozen Nile perch and tilapia, is estimated at its peak to be 3,614 tones valued at 143,618,000 US dollars. The EU is the major destination of fish and fish products from Uganda accounting for approximately 70% of the total fish exports.
Aquaculture production has remained at subsistence level with most of the marketing of aquaculture products done locally on site. However, with declining production in capture fisheries, aquaculture is expected to fill the gaps in the domestic as well as export markets. Market outlook for fish is expected to be high in the medium and long term. Currently, a number of supermarkets (including Uchumi) are providing markets to aquaculture products.

Impact on food security – 7.0

Potential impact on food security is high. Fish is an excellent source of protein for most households. There are local species of fish like Mukene, Nile perch, tilapia and by-products which provide food for local population, thus contributing to their food security.
Fisheries resources cover a wide geographical distribution, thereby presenting opportunities to diverse segments of the population as a source of livelihood. Environmental factors, the increasing population in the fisheries and inappropriate policies are a big threat to fish production. It should also be noted that the increased export of fish internationally to the EU has also resulted in decreased fish available for domestic or home consumption as fish price locally has gone up. This creates an opportunity for aquaculture fish product to bridge the domestic requirements.

Potential for impact on incomes – 7.0

Fish posses very high potential for impact on incomes. Demand for fish is robust and growing in the domestic, regional and international markets. Current supply is lower than demand, therefore the high price of fish currently being experienced in the markets (the current price trend is good). In 2006, total production stood at 216,000 tons valued at 123 million US dollars. The sector employed 700,000 persons directly. Additional opportunities in trading and processing fish also exist. However, incomes from fisheries are affected by declining catches, lack of saving culture, HIV/AIDS, and new fisheries policies among other factors.

Secondly, fish is a high value product (fresh, smoked, dried, chilled and frozen) with high domestic and regional demands especially in Rwanda, DRC and Sudan. There is therefore great potential to impact on household income especially for small scale farmers through regional markets to neighboring countries. Need for small-scale farmers to adopt aquaculture fish farming.

Location-specific advantage – 7.5

There is wide distribution of fisheries resources country-wide. There is high potential for aquaculture farming in different regions of Uganda with available local species for aquaculture farming (nile perch, tilapia, cat fish and ningu). Both the north and south offer potential opportunity for establishment and expansion of aquaculture fish

farming. Availability of land, labour and flat lying areas in the north and part of the south (Bushenyi, Mityana, Kibaale, Kabarole, Mbarara and Ntungamu districts) make fish farming particularly attractive venture. The north has fairly good agro-ecological conditions for fish farming especially with the relative peace in the north now (Gulu, Amuru, Kitgum, Pader, Lira, Apac, Soroti and Kumi are all potential for aquaculture establishment and expansion). There is also possibility for cage production in areas surrounding lakes especially lakes Victoria, Kyoga and Albert. Likewise, availability of domestic and regional markets makes aquaculture highly attractive in the north and southern Uganda. The following areas need particular attention if fish farming is to be profitable: inadequate supply of fish fry; lack of information on feasibility of commercial culture/poly-culture, lack of appropriate feeds and feeding technologies for commercial culture species; poor pond research results application; lack of knowledge and information on economic and social feasibility of aquaculture especially cage farming; lack of culture to involve investors into aquaculture for traditional species; and inefficient dissemination of fish farming technologies and lack of expertise in fish farming.

Potential for increasing value and volume of marketed agricultural production from project areas – 6.5

Potential for increasing volume and value of marketed fish and fish products is medium to high. There is possibility for promoting, identifying buyers and negotiating favorable terms of trade. Measures to increase the shelf life of fish through proper fish handling, preservation, processing and storage are necessary if volumes of marketed products are to increase. There is very high possibility of improving marketed volume through linking fish feed producers to other crop value chain such as grains, cassava, etc. This is essential for production of fish feeds for aquaculture.

Potential for value addition, premium price capture and industrial use – 6.0

Although the chilled Nile Perch fillet is among the high valued product, value addition is still possible through improved processing into other products such as smoked fish, dried fish and other industrial products for domestic and export use. There is very high possibility of improving premium price capture through linking fish feed producers to other crop value chain such as grains, cassava, etc. This is essential for production of fish feeds for aquaculture. There is also possibility for high premium capture through certification of fish for international markets.

Potential for private sector/producer linkages – 6.0

There is high potential for private sector producer linkages in areas of processing, marketing, training, etc. Linkage can be forged through coordination between producer and processor associations, marketing agreements, training and co-management of the resources. Private sectors such as Ekitangaala Fish Farms are currently involved in fish farming (production and marketing) and they seek additional suppliers but the quality of fish still remains a big problem. A number of private and public sectors are also involved in fisheries including NARO (National Fisheries Resources Research Institute/NaFRRI) (development of fisheries technologies), Northern Uganda Social Action Fund (NUSAF), Ekitangaala and Uganda Cooperative Alliance (UCA)

Potential for leveraging private and/or public sector investment – 6.5
There is potential for Public private partnership (PPP) investments in infrastructure and services and in fish processing (medium to high). Already a number of private sectors are involved in processing and marketing of fish in Uganda. The public sector resources are very thin but the private sector resources are expected to increase as demand increases with premium price capture. NARO/NaFRRI as public institution is involved in technology development and dissemination in fisheries and aquaculture.

Viability of integrating producers/farmer groups into value chains – 6.5
This is possible but there is need to organize and build capacity of the producers/farmer groups to improve their production and bargaining power within the value chain. There is also need to improve on infrastructures such as cold storage and transport system as the demand for fish increases. Expertise in fish farming is one of the areas of concern which needs improvement as it is currently low or lacking.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 6.0
Fisheries provide opportunities for a wide range of stakeholders in the areas of fishing equipment ownership, fishing labor, fish processing, fish trade, and fish farming. Fisheries co-management in Uganda has been established to contribute to poverty reduction through participation of the different beneficiaries in resource management. The women, youth, vulnerable group and disabled are all involved in fish value chain (processing and marketing) and fish farming. Challenges for the realization of poverty-reduction objectives include financing; changing attitudes and securing commitment of local government officials and communities; and, ensuring that empowerment of the 'marginalized' is effective. There is need to provide suitable environment for wider participation of a range of stakeholders in the value chain.

Potential for highest use of productive resources in project areas – 6.5
This could be made possible through availability of wide range of fish species, production and processing skills, support services, infrastructure and social services and marketing. In other words, the potential is high but support services are required to make it feasible. Both in the north and south, especially in the north, there is available land and labor but expertise and other support services are required to empower farmers realize the benefit of fish farming. Aquaculture could become the highest income generator especially in the rural areas.

Potential for "bankability" within a reasonable timeframe – 3.0
This is low to medium for farmers or farmer groups who may not easily access credit facilities to improve the fish business. The possibility is high for processors with big investments to access credits/financial support from banks and other financial institutions. This could have been possible given high prices fetched by fish and

availability of market for fish and resource management efforts by Government for sustainability.

Overall importance in Uganda's agricultural economy – 7.0
Fisheries are very important to the economy of Uganda as they contribute 2.2% to total GDP. It is the second largest foreign exchange earner for the economy. It provides incomes to many smallholder farmers and other actors along the fisheries value chain. It employs over 700,000 directly and over 1,000,000 indirectly. The current value from export earnings stand at US $ 117,364,000.

2.5 LIVESTOCK

Total score for livestock was 109 (77.9%) earning it 2nd overall ranking position as cassava. The details are as given below.

Market potential – 9.0
Livestock resources offer Uganda a commendable tool in the poverty eradication programs, because of the high domestic and export market opportunities for livestock and livestock products. The livestock sector in Uganda contributes about 17% of the national GDP in the form of milk and meat. The livestock population in Uganda comprises of 6,100,000 cattle; 1,150,000 sheep; 6,852,000 goats; 1,719,000 pigs and 33,000,000 chickens (FAOSTAT, 2004). Approximately 4% of the cattle population is exotic and crossbred dairy cattle. Cattle population has continued to grow, at a rate of over 4% per annum, in response to increasing demand for milk and meat in the local markets. Higher rates of growth are envisaged as Government pursues its policies of modernizing and commercializing livestock agriculture. The increasing human population is expected to worsen the situation unless appropriate technologies to increase market-oriented production are forthcoming.

Impact on food security – 6.5
Livestock (cattle, goats, sheep, pigs and poultry) are good sources of animal protein. Currently per capita consumption of milk (40 liters) and meat (8.8 kg) is lower than the FAO recommendations of 200 liters and 50 kg, respectively. The gap indicates opportunities for domestic market that could be exploited with rising incomes from employment particularly in non-primary agriculture, industrial and services sector of the economy. MAAIF has targeted to increase per capita annual milk consumption to 60 liters by the year 2010.

Analysis of historical data shows that demand for meat has been increasing at a rate of 7% per annum over the last decade. Similar trends in milk consumption have been observed that the projected consumption target of 1.2 billion liters of milk has been overtaken by end 2004. The development of the Food and Nutrition Bill is likely to provide additional impetus to increased consumption of livestock and livestock products.

Potential for impact on incomes – 8.0
In the medium to long-term targeting, the potential is very high. The poor in developing countries derive a larger proportion of their incomes from livestock (cattle, goats, sheep, pigs and poultry) than the wealthier. In Uganda, livestock

impacts on the lives of over 300,000 households. Hired labor constitutes a significant input in livestock production especially under intensive management, with wage earning ranging from UGX 15,000-50,000 per month. Milk processing and marketing provide employment for many.
In Uganda, there is high demand for animal protein which can be obtained from dual purpose cattle providing both meat and milk and also used for traction to increase land area for production. The demand for meat in Sudan out weights supply and so quite good opportunity exist to improve income though livestock improvement. The demand for meat and milk is rising as the population in the northern urban areas increases. Other areas where value chain actors can raise income include vaccine development, forage seed production, rearing of small ruminants such as goats and sheep, operating modern abattoirs and leather processing. There is need to support development and dissemination of appropriate technologies to increase market-oriented production.

Location-specific advantage – 7.5
Livestock production is both in the south and the north but with more organized production and marketing in the south (a lot of milk is currently produced in the south but there is opportunity to produce similar milk in the north). The north has potential for management of dual purpose livestock providing both meat and milk and also be used as source of power for transportation and cultivation. There is rapid increase in population in the urban areas of the north resulting in increased demand for meat and milk. The availability of large land areas (rolling plain), sandy-loam in nature and availability of many swamps favor both rearing of animals and production of crops. This calls for use of animal traction to increase land under cultivation, therefore, the use of dual purpose animals. The availability of regional markets for meat and milk and other livestock products (hides and skins) in DRC, Sudan, Kenya and Rwanda means an opportunity for extension of livestock production in the north. The passing of the EAC Union Bill in 2005 lowered regional import on dairy products is an incentive to increase production in the north. There is therefore, need to develop and disseminate technologies which act to increase market-oriented production in the north.

Potential for increasing value and volume of marketed agricultural production from project areas – 8.5
The potential is very high. Livestock form an important component of the farming systems of the people in the North and North-East. The use of ox-drawn implements for primary cultivation dates way back in the early 1900's when the technology was introduced in Uganda to promote commercial production of cotton which was then to become one of Uganda's leading cash crops. The technology spread widely, and before the insurgency in the 1980's the north and northeast regions formed the major food basket of Uganda producing export and food crops, cattle and other livestock for domestic consumption, export and industry. The natural terrain (rolling plains), the soils (sandy-loamy) and the fact that five arms of Lake Kyoga lie in the project area, coupled with numerous large swamps favored the rearing of livestock and their use for crop farming (factors for increasing volume of livestock and livestock products).

Other means to improve value and volume milk and meat is the adoption and use of improved feed resource management technologies and improved stocks and breeds (over 80% of milk produced from indigenous breeds whose size is estimated at over 95% of the population, while the less than 5% of improved breeds contributes 16% of total milk output). There is therefore, need to develop and disseminate technologies which act to increase market-oriented production in the north.

Potential for value addition, premium price capture and industrial use – 7.5

Beef breeds, mainly Boran had been introduced for crossing with the Zebu cattle. The beef and milk from the Zebu and other continental breeds, have high potential for premium price due to the unique characteristics (flavor, tenderness, juiciness due to intramuscular deposition of fat referred to "marbling fat"); and the milk possesses higher proportions of solids (butterfat, SNF – solids not fat) than the Sanga types. Thus, it has potential for blending with that from the Friesian, Holstein and Ankole animals, which are low in fat and SNF, and could be marketed at a premium price. Therefore, there is need to improve on animal breeds (meat, milk and dual purpose breeds) and supply of stocks. There is also need to integrate livestock value chain and other crop value chains for production of animal feeds to improve production (volume and value).

There is a high potential for direct export of meat to regional markets and supply to niche markets in urban areas. The region has airports (Arua, Gulu and Soroti) for direct supply to regional markets and niche markets in urban areas. However, this requires modern abattoirs to attract investors and consumers. In the 1960's, there was a modern abattoir in Soroti, the structures were dilapidated. Local investors have in recent times face lifted the facilities but more improvement is required.

If modern abattoirs were in a number of places in the project areas, then associated industries could come up. These include quality cuts, sausages and other processed meat products to capture premium price. Other industries include: tanning industries for hides and skins and leather industries to produce finished products (shoes, bags, belts, etc.). Other associated industries for premium capture include: animal feeds from offals and bone meal; buttons from hones; glue from hooves and organic fertilizers. Addressing the challenges of poor breeds, milk quality and infrastructures will go along way in addressing issues of value addition, premium price capture and industrial use.

Potential for private sector/producer linkages – 7.0

Potential for private sector/producer linkages is high. Most smallholder farmers are involved in livestock production and management and they supply the required livestock and livestock products (meat, milk and hides and skins) to traders and processors through the middle men or directly. Processors such as Dairy Development Authority (DDA) and Jesa Dairy Farm and others process milk into various dairy products (fresh milk, UHT, butter, ghee, yoghurt, ice cream and others) while Quality cuts and other processors turn beef into various meat products.

Other private sectors working closely with producers include the various NGOs/CBOs (Send a cow, Heifer project etc). Areas of linkages between the private sector and the producers include agro-input and service supply (veterinary services, drugs, chemicals, feeds and raw materials); milk collection, transportation and milk

processing (fresh milk, UHT, butter, ghee, yoghurt, ice cream, etc); manufacture of implements and feeds; and slaughter houses and modern abattoirs.
There is need to provide supportive environment for entry of producers in the value chain and enhance their capacities to effectively and efficiently produce quality products. Also consideration should be given to infrastructures to allow production of quality products to capture premium price.

Potential for leveraging private and/or public sector investment – 7.0

Both Government and the private sector continue to invest in the development of the livestock sector. Government is currently investing under the Dairy Development Masterplan, the Meat Production Masterplan, the Small Ruminants Development Program, the Agricultural Research and Training Project (NARO) and the National Agricultural Advisory Services (NAADS) support program. The major areas for investment in the livestock value chain include development and production of vaccines (NARO and Makerere University (MAK)); development of disease and pest management strategies (NARO, NaLRRI and Mbarara ZARDI); forage seed production (farmers, farmer groups/producers); manufacture of animal feeds (private sector); multiplying breeder stock for domestic and export needs (private breeders and NARO); operating modern abattoirs (private sector); value addition to milk and meat (private sectors); animal breeding and supply of stock (improved breeding stock and breeding practices, hatchery unit improvement, especially as government breeding farms have been phased out creating a big opportunity); and leather processing (Uganda's hides and skins are exported in row form attracting less price). Other opportunity areas especially in the north are the processing of milk and meat to meet the increasing demand in the north and surrounding countries (DRC and Sudan).
There is need to improve on infrastructures to allow for improved production and marketing of livestock and livestock products (will attract both public and private investors in the value chain).

Viability of integrating producers/farmer groups into value chains – 8.5

Livestock production is mostly by smallholder farmers (over 90% of livestock are owned by smallholder farmers) and a few medium to large scale farmers. The smallholders can organize themselves into farmer associations which can produce and supply the processors with the required livestock products. The integration of producers in the livestock value chain is essential to increase value and volume. It is essential that the producers' skills and knowledge be enhanced in management and post harvest handling of animal products and the producers be linked to better markets for premium price capture. The farmer associations are then in position to comply with set standards and disease control/management regulations for production of good livestock and livestock products as required for by the buyers.

Potential for participation by a wide range of beneficiaries, including women and vulnerable groups – 7.0

The potential of wider beneficiaries' participation in livestock value chain is high as producers/farmer groups, public and private sectors are all involved in the value chain. The most vulnerable group, the IDPs, and those migrating still continue to consider livestock as source of their income and wealth. The use of oxen for ploughing has remained a male-dominated activity although some women especially those that

are family heads have learnt to use it. Women and youth, therefore, can be trained to take advantage of draught power for transportation (fetching water, firewood and food), planting, weeding, ridging (sweet potato) and harvesting (groundnuts) which have not been widely exploited. Women, youth and some disadvantaged groups can participate in training oxen for the various uses, yoke making and harnessing devices, making ropes, milk processing utensils, etc. Women can participate in calf rearing, growing of pasture seeds and pastures, which they can sell.
But consideration should be given to improving milk quality, infrastructures, pronounced seasonality of milk production, feed resources, diseases, high input costs, poor breeds and inadequate feeding and better marketing structure. There is need to provide suitable environment for wide range of stakeholders to participate in the value chain especially the vulnerable groups.

Potential for highest use of productive resources in project areas – 7.0
The potential is high in the value chain. There is need to improve on infrastructures, breeds and stocks, feed resources, marketing system and value addition in the north as most of these are lacking or in sorry state. The north is blessed with vast land areas which can be used for dairy and beef production. But it should be noted that the natural pastures in the north (mostly "thatching grass") grow fast and become stemmy as the dry season sets in. They are often burnt to allow re-growth, but this also deprives animals of the available feed resource. The communal grazing system has another big problem, that is, the difficulty to regulate grazing pressure leading to land degradation. This results into removal of nutritious species of grass and promotes non-nutritious species. If the natural pastures are improved with more nutritious and persistent pasture varieties and legumes, this will discourage the burning of grass during dry season. There will be need to introduce fodder banks so as to take care of dry-season grazing. The various swamps are natural grazing areas during the dry season, although there are conflicting interests in their utilization e.g. rice, sugar-cane and vegetable farming.

The use of animal power for transport, land preparation and other field operations is possible in the north as the soils are light and sandy loam and rolling, and availability of cheap labor and easy integration of livestock in the farming system and availability of markets in the urban areas and in the neighboring Sudan and DRC make the north better placed for highest use of productive resources.

Potential for "bankability" within a reasonable timeframe – 7.0
Potential for bankability is high in the livestock value chain. Livestock farmers are better placed to access finance and credit facilities more easily than crop producers as their animals are considered capital assets. The possibilities are also high for processors of livestock products to access credit and finance.

Overall importance in Uganda's agricultural economy – 8.5
Animal agriculture is one of the most important sub-sectors of Uganda's Agriculture and is currently among the most rapidly developing industries. The livestock sector in

Uganda has been the most resilient sub-sector of the agricultural economy by making the most stable contribution to the agricultural economy (livestock contributed 17% of the national GDP in terms of milk and meat). The livestock population in Uganda comprises about 6 million cattle with approximately 4% of the cattle being exotic and crossbred (FAO 2004). It is estimated that peasant farmers and pastoralists own over 90% of the national cattle herd and almost all the small ruminants, pigs and poultry, producing the bulk of domestic milk and meat. In smallholder system, livestock are important because they provide direct income, they are capital assets, they produce manure for use as fertilizers and fuel and they are a source of power for transport and cultivation. In the traditional economy possession of livestock is an indicator savings and investments from surplus; and often ownership of livestock especially cattle is an indicator of wealth and social security.

The new Livestock Development Strategy stipulates an increase of meat production from 102,000 metric tons in 2001 to 180,000 metric tons by end of 2006; targeting an annual export of 40,000 metric tons by the year 2010. Hence opportunity for livestock as a pathway out of poverty is enormous and so are the challenges that need to be overcome to attain meaningful development.

2.6 HORTICULTURE

Total score for horticulture was 88.5 (63.2%) earning it 13th overall ranking position. The details are as given below.

Market Potential – 7.5

The fruits and vegetables have become an important sub sector of the Ugandan economy. They contribute a big share of the non-traditional exports. The sub-sector has seen tremendous growth since 1990. During 1991, the major fresh produce exports were estimated to be worth US$ 600,000 rising to US$ 1.42 million in 1996. Export values increased from US$ 1.8 million in 1997 to US$ 3.56 million in 2001. Uganda was listed 21st among the list of ACP suppliers of fruits and vegetables to the European Union by value in 2001. This was less than 1% of the total market demand in the European Union. In 2001, Uganda exported 2.168 tons of bananas, apple bananas, and pineapples with total value of US$ 1.29 in 2001, compared to 884 tons worth US$ 903,000 in 2000 within the COMESA region.

Key horticultural exports by volume include: hot pepper, fine and runner beans, apple bananas, green chilies, okra, pineapples (fresh and dry), and passion fruit. Others include jackfruit, mangoes, and papaya (fresh and dry). Uganda is the market leader for fresh hot pepper in Europe and orders far exceed supplies. As town population increases in the north, there are good domestic and regional markets for fruits and vegetables. Fruits and vegetables are daily sources of incomes to smallholder farmers in the rural markets. Nevertheless, there is a very limited internal market due to low purchasing power and the fact that the majority of the population lives in rural areas where each household produces for its own requirements. However, there is a potential for growth in the EU-market, but Uganda lacks consistent supplies both in quantity and quality yet Uganda's soil and climate is suitable for various types of vegetable and fruit production.

Spice production in Uganda is limited. There is potential for increased production of these spices based on past production trends. They have been found to be suitable to

the present climatic conditions prevailing in this country and they do have a great demand in the world market.

Impact on food security – 5.0

It is estimated that more than 30,000 people are involved in production of horticultural products for export. Horticultural crops are produced basically by small scale farmers in the rural areas scattered in different parts of the country. The benefits of the industry are spread in several districts of Uganda contributing a total of 3% of agricultural land where export crops occupy about 8,041 ha. Horticulture only contributes to national food security through ensuring continuous availability of food (fruits and vegetables) throughout the year and income, which when earned may be used to purchase carbohydrate and other protein food sources. Changing food habits of many urban people is demanding for more consumption of vegetables. There is high demand for vegetables especially among the vulnerable groups (IDP) and children in the north to provide the nutritional (vitamins and minerals) and therefore ensure the wellbeing of people, which is the main reason the sector should be promoted.

Impact on incomes – 7.0

Many rural households generate income on a daily basis through the sale of fresh fruits (mango and passion fruits) and vegetables (onions, tomatoes, cabbages) through both formal and informal markets such as road side markets and from neighbor to neighbor. The income may range from 2,400,000 Uganda shillings annually per acre for smallholder farmers (0.5 – 5 acres) to over 20 million Uganda shillings annually for commercial farmers. There is great demand for vegetables both locally and regionally and increasing production and quality could target high priced markets. Production of vegetables is dominated by women and their short growth duration ensures quick return to investment for the producers especially the women. Therefore, there is need to promote short duration vegetables especially for the IDPs being resettled currently as assured sources of nutrients and vitamins (high potential to improve nutrition among the IDPs).

Location specific advantage – 7.5

Of the available 19 million hectares of available land for agriculture the area under fruits, vegetables and spices is less than 1%. The average yield of fruits and vegetables is low, 11.8 and 6.9 metric tons per hectare, respectively. Given the abundance of natural resources like soils, fairly well distributed rainfall and moderate climate, Uganda is capable of producing most of the tropical and sub-tropical, or even temperate fruits. Uganda has good natural conditions for organic agriculture and many crops can be grown. Uganda is composed of diverse soil and climatic conditions providing ample opportunity to grow a variety of horticultural crops.

Vegetables can be grown anywhere depending on the type but green vegetables which manure quickly like amaranthus, cabbages, tomatoes, and onions can also perform well in northern Uganda where there is available land and labor and favorable climate. Proximity to Sudan and DRC and availability of IPD being resettled (nutritional requirements especially the children) makes the north ideal for improvement of vegetables and fruits.

Potential for increasing value and volume of marketed product – 6.0

The potential for increasing value and volume of marketed products is at medium level. There has been interventions in extension and farmer training, setting

demonstrations, research, availing improved seeds for planting, cottage processing/value addition, post harvest handling and marketing, involvement of private sector players in the sector, capacity building of farmer/farmer groups through participatory planning and monitoring and evaluation. However, more training is needed to increase volumes of horticultural crops grown and marketed.

The bulk of horticultural crops in Uganda are marketed in fresh form leaving a lot to be desired in terms of quality. Limited or no processing is done in many areas. Processing is limited to drying and fresh juice extraction. Processing is important for increasing value and product diversification. It also results in increase in volume of marketed products. The market for processed products is growing even locally in the country as more supermarkets are gaining popularity. Additionally, processing will reduce on the huge (<50%) post harvest losses resulting from the stringency of the fresh produce quality requirements. It will also allow for a prolonged access to market-desired products during periods of field scarcity. Investment opportunities exist in Uganda to set up commercial farms to produce and export a range of horticultural products.

Vegetables are considered home gardens with less incentive to improve value yet they are becoming highly priced. The market for fresh chilled and frozen vegetables especially mixed legume vegetables like snap beans, asparagus is expanding. This requires investment in chilling and freezing facilities and being able to produce the vegetables on a large scale to avoid fluctuations in exports. Locally producers can increase land under production but quality may be compromised. There is need to invest in processing to improve value. This will require investments in integrated production and marketing systems by large-scale growers, linked to organized groups of out growers.

Potential for value addition, premium price capture and industrial use – 6.0

The potential for value addition exists along the value chain by processing in order to attract a premium price for the products. One would say the potential is at medium to high level depending on the horticultural crops but is still a long way to go in terms of quality. Packaging material is currently imported based on the specifications given by the importers. There is, therefore, potential for investment in packaging. Opportunities exist in setting up of cold storage facilities with grading and sorting facilities for both fruits and vegetables; and quality improvement through varietal improvement (production), post harvest handling, capacity building, and simple processing (proper packaging and freezing) for commercial markets.

Potential for private sector/producer linkage – 5.0

The potential is low to medium as vegetables and fruits are considered home gardens with less incentive to improve value/quality and mostly traded fresh. Vegetables and fruits are mostly produced by smallholder farmers who need to be organized into production groups or organizations to facilitate quality control and training. In case of northern Uganda, there is increasing demand for fruits and vegetables from available NGOs/CBOs/CSOs communities and restaurants. It is unfortunate that most of the vegetable seeds are imported by from outside the country making them less affordable to the local farmers. The seed companies are involved in selling the seeds and agro-chemicals needed for the production. For Uganda to succeed in expanding its market share, private-public sector interventions should concentrate on increasing

production, processing for commercial markets and ensuring stable and high quality supplies. There is also need to enhance capacities of extension agents through University programs. Currently, MAK (Faculty of Agriculture) offers training in horticulture (B.Sc. Horticulture) but the man power is still low. There are many collaborating/promoting institutions in Uganda whose support has made horticulture sub sector a rapidly growing sector for the last ten years including Uganda Export Promotion Board (UEPB), NARO, producers, transporters and traders.

Potential for leveraging private and/or public sector investment – 5.0

Due to the liberalized economy in Uganda, the future of horticulture sub sector is very promising and the potential for leverage private/public investment is good (medium level). Through Private sector partnerships and strategic alliances, participation of communities has been improved in various value networks targeting private sector buyers or exporters. At the current moment, fruit and vegetable industries are not well developed in the north although there is high local and regional (Sudan and DRC) demand for the products. Currently, most private processors and exporters of fruits and vegetables are located in the south where there are better facilities. These private processors and exporters can be encouraged to procure fruits and vegetables from the north if available facilities could allow. There is good communication network between the north and south and nice agro-ecology and available land and cheap labor all favoring fruit and vegetable production.

Viability of integrating producers/farmers groups into value chains – 8.0

The potential for integration of producers in the value chain is very high as most of the fruits and vegetables are produced by smallholder farmers. The issue of concern still remains in improvement of quality and quantity for consistent supply of fruits and vegetables on a sustainable basis. There is need for capacity building for the producers, and organize producers into production groups for better quality production and access to other services.

Potential for participation of a wide range of beneficiaries including women and vulnerable groups – 7.0

There is a big potential for participation of wider range of beneficiaries in horticultural crop production as most of the vegetables are produced by the women and the youth who form the biggest percentage in the agricultural sector. There is potential for participation of processors as huge opportunities exist in value addition to improve on quality and quantity. Other participants in the horticultural value chain includes NAADS, NARO, NGOs, CBOs, seed companies, traders and exporters (in the north mostly exported to DRC and Sudan in the fresh form).

Potential for highest use of productive resources in project areas – 6.5

There is good potential (medium to high) for the use of productive resources such as land, water, financial and environmental resources in the project areas. In the north, there is available land, cheap labor and good agro-ecologies and the need to provide easily affordable source of vitamins and proteins to the IDP especially the women (pregnant women) and the children. The environmental conditions in the north also allows for some of the first maturing vegetables to be grown three to four times in a year under natural conditions. In addition, there are available markets for vegetables and fruits. The rest of the country also offer opportunity to develop the fruits and vegetables suited to other agro-ecologies than that of the north (cool climate

vegetables and fruits) as demand increases, and communication facilities improve. The issue of quality and quantity for continued supply needs be addressed as a priority.

Potential or bankability within a reasonable period – 2.5

The potential for bankability is low to medium. Producers engaged in fruits and vegetables are less likely to access financial resources especially those growing vegetables. Processors of fruits are more likely to get financial assistance or credits. There is need to gain confidence in the available markets for continued supply especially those from the south where large needs exist and also have assurance for quality control to meet the desired markets. There are still high losses in the fruit and vegetable sector in Uganda reducing chances for loan repayment if producers access the credits.

Over all importance in Uganda agricultural economy – 5.5

The horticulture sector is becoming an important and good source of foreign exchange and economic growth for Uganda. It is one of the fastest growing sub sectors in Uganda with an estimated growth rate of about 20% per annum; however there is great potential for improvement although still a long way to go to improve on value, volume and value addition for horticultural crops. This is because Uganda has a low market share for almost all horticultural products, and therefore has an opportunity for rapid growth from potential buyers. It is the market leader for fresh hot pepper in Europe. More so, according to IDEA estimates, the export earnings can be increased to $300 million, by strategic intervention. Star performers in the sector include fresh flowers which are growing at an amazing rate of 475% in value since 1995, vanilla, spices, fruits and vegetables. Some fruits are exported to neighboring markets such as DRC, Sudan, Kenya, Rwanda and Tanzania contributing about $1.2 million to Uganda's export earnings. In general, most of the fruits and vegetables grown in Uganda are domestically consumed. There are still large quantities of imported canned vegetables, fruits and juice from Kenya and South Africa.

Nevertheless the access of Ugandan products to these markets is becoming increasingly difficult as a result of strict safety and quality standards on food at major export markets. Horticultural industry therefore is making a major contribution to the national economy in terms of foreign exchange earnings, employment opportunities, rural development and food and nutritional security nevertheless this is still very low production compared to other sectors (Hossain, 1995).

3.0 ECONOMIC DEVELOPMENT STRATEGIES AND POLICIES IMPACTING ON POVERTY AND THE AGRULCITURAL SECTOR IN UGANDA

Since 1987, the Government of Uganda (GoU) has been implementing economic reform programs aimed at restoring economic growth and development. Uganda's broad macro policy objectives hinge on ensuring food security, economic growth and poverty eradication. This section, therefore, looks the confluence of LEAD goals with Government of Uganda's development goals as outlined in the Peace, Recovery and Development Plan (PRDP); the Poverty Eradication Action Plan (PEAP); and the Plan

for Modernization of Agriculture (PMA) and other relevant objectives such as the Comprehensive Africa Agriculture Development Program (CAADP) and the Initiative to End Hunger in Africa (IEHA).

3.1 African Union (AU) New Partnership for Africa's Development's (NEPADs) Comprehensive African Agricultural Development Program (CAADP)

In response to the numerous development challenges and the opportunities that agriculture provides, the African Union (AU) and New Partnership for Africa's Development (NEPAD), launched an agricultural-led development initiative: the Comprehensive African Agriculture Development Program (CAADP). This framework recognizes that agriculture-led economic growth is central for alleviation of poverty and hunger and that countries pursue a 6% average annual agricultural sector growth rate, and 10% of the annual national budget be allocated to the agricultural sector if these countries are to meet the Millennium Development Goals (MDGs) by 2015. The four CAADP pillars for improving Africa's agriculture are:

(1) Extending the area under sustainable land management and reliable water control systems;
(2) Improving rural infrastructure and trade related capacities for market accesses;
(3) Increasing food supply, reduce hunger, and improve responses to food emergency crises; and,
(4) Improving agricultural research, technology dissemination and adoption.

The Government of Uganda has committed itself to indicators linked to MDGs for poverty and NEPADs goal for economic growth. Livelihoods and Enterprises for Agricultural Development (LEAD) project in Uganda will directly contribute to CAADP pillars 2, 3 and 4 and LAED objectives of increased productivity, increased trade capacity, and enhanced competitiveness within selected chains is consistent with CAADP objectives and in turn with the Uganda national development objectives and strategic priorities for agricultural development.

3.2 The Poverty Eradication Action Plan (PEAP)

The poverty Eradication Action Plan (PEAP) is one of the key government's approaches in eradicating mass poverty and fostering economic development in Uganda. The PEAP was first developed in 1997 as a principal master medium-term development framework for Uganda. The PEAP was formulated on the premise that at least by 1997, 44% of Ugandans were poor and therefore were not able to meet basic requirements (MFPED, 2000). In 2004 PEAP detailed a shift in policy focus from economic recovery to sustainable growth and structural transformation to accelerate poverty reduction. The 2004 version of PEAP was organized around five pillars:

(1) Economic management – maintaining economic stability and promoting private sector driven, export-led growth,
(2) Enhancing competitiveness, production, and incomes – effective implementation of the Plan for Modernization of Agriculture (PMA), as well as that of the Medium-term Competitiveness Strategy to enhance private sector skills and business development,
(3) Security, conflict resolution, and disaster management,

(4) Governance – strengthen political, legislative, and justice systems and bolster public sector management and accountability, and
(5) Human resource development – human capital formation through improved access to and utilization of education and health services.

LEAD's objectives of increased productivity, increased trade capacity and enhanced competiveness of the selected value chains perfectly contribute to PEAP pillar 2 (enhanced competitiveness, production and incomes) and pillar 1 (economic management). LEAD objectives aims at increasing the ability of the poor to raise their incomes, increase their access to agricultural information through their participation in development projects in order to develop skills and increase the returns to their asserts especially those dependent on agriculture for their livelihoods. This is what PEAP fosters to achieve through closer public private partnerships.

3.3 The Plan for Modernization of Agriculture (PMA)

The Plan for Modernization of Agriculture (PMA) is an essential element in the implementation of the PEAP, particularly in attaining the agriculture and rural development objectives of government. The vision of PMA is "poverty eradication through a profitable, competitive, sustainable and dynamic agricultural and agro-industrial sector". As such it is a cross-sectoral plan whose main objectives are to: (a) increase incomes and improve the quality of life of subsistence farmers through increased productivity and increased share of marketed production; (b) improve household food security through the markets rather than emphasizing self sufficiency; (c) provide gainful employment through the secondary benefits of PMA implementation such as agro-processing factories and services; and (d) promote sustainable use and management of natural resources. The PMA's contribution to the PEAP is based on increasing farm productivity, increasing the share of agricultural production that is marketed and creating on-farm and off-farm income. As will be noted, LEAD objectives emphasized increased productivity, increased trade capacity and enhanced competitiveness of selected value chains which is compliant with PMA objective 1 (increased productivity and increased share of marketed products) and objective 2 which looks at improved household food security.

3.4 Peace, Recovery and Development Plan (PRDP)

The GoU has over the years been implementing development programs aimed at reducing poverty nationally. The number of Ugandans who were unable to meet their basic needs declined from 56% in 1992 to 38% in 2003 and further to 31% in 2006 with a simultaneous improvement in other indices relating to health, education and water and sanitation. However, the welfare indices for Northern Uganda have not improved at the same pace as the rest of the country. Poverty has remained significantly high, literacy rates have remained low and access to basic services has remained poor. The presence of prolonged war in the north for over 2 decades has been responsible for poor living conditions in the north which has been a major impediment to increasing GDP growth in Uganda.

The Government of Uganda then launched the PRDP for northern Uganda in October 2007. The overall goal of PRDP is to consolidate peace and security and lay foundation for recovery and development. This is achieved through four core objectives that are mutually reinforcing: (1) Consolidation of state authority, (2) Rebuilding and empowering communities, (3) Revitalization of the economy, and (4) Peace building and reconciliation. LEAD program in Uganda will contribute greatly to PRDP pillar 3 which seeks to re-activate productive sectors in the region with particular emphasis on production and marketing.

3.5 Initiative to End Hunger in Africa (IEHA)

Launched in 2002, the Presidential Initiative to End Hunger in Africa (IEHA) is a multi-year effort designed to help increase agricultural income and fulfill the United Nations' Millennium Development Goal (MDG) of cutting the number of hungry in Africa by half by 2015. This initiative focuses on promoting agricultural growth and building an African-led partnership to reduce hunger and poverty by investing in agriculture oriented towards small-scale farmers. IEHA works to create conducive environments for agriculture to flourish by working with African governments, regional organizations, multilateral development institutions, the private sectors, universities and other non-governmental organizations. USAID is working to develop programs and policies that open up markets to agricultural trade, improve infrastructures, support small-scale farmers, provide safety nets to the most vulnerable groups, and exploit technology advances. USAID also works with the African Union's New Partnership for Africa's Development (AU/NEPAD) and donor partners to address the policy and technical barriers that are making countries famine prune. All these efforts are aligned with and directly support the AU/NEPAD Comprehensive African Agriculture Development Program (CAADP).

IEHA's key principles include building regional dynamism, synergies, and spillovers; building alliances and broad-based political and financial commitment among public and private development partners in Africa and elsewhere; and focusing investments on core activities designed to eliminate hunger in Africa. IEHA's investments are concentrated in 6 pillars namely: 1) Science and technology, 2) Agricultural trade and marketing, 3) Human and institutional capacity, 4) Producers organizations, 5) protecting the vulnerable, and 6), Environmental management. LAED resources will directly support pillars 1, 2, 3, 4 and 5.

3.6 NGOs, CBOs and the Private Sector (PS)

As the development processes continue to be emphasized in Uganda today, the roles played by the private sector, Non-governmental Organizations (NGOs) and Community-based Organizations (CBOs) is increasingly getting recognized. While the local governments have taken over direct provision of services within a number of natural resources sector, the role of central government is getting limited to creating an enabling environment for the CBOs, NGOs and the private sector to operate. Central government also remains with the mandate of putting in place appropriate legal and regulatory frameworks for the local government, private sector and NGOs/CBOs to operate.

The communities, CBOs and most NGOs are getting directly involved in providing agricultural development interventions. Some NGOs or CBOs are involved directly in service delivery while others contribute through advocacy. LEAD plans to implement the interventions through close collaboration with private sector, local government, NGOs and CBOs who are involved in community development and especially those involved in promotion of the selected value chains by LEAD in order to improve the livelihoods of the poor communities in Uganda.

4.0 CONCLUSION AND RECOMMENDETATIONS

4.1 Conclusion

The synthesis analysis of the collected information from the various sources and those earlier on collected during LEAD proposal development confirms that the commodities that were selected for support under LEAD (staple crops including upland rice, maize, millet, sorghum, common beans, groundnuts, soybeans, sunflower, sesame, cassava and sweet potatoes; coffee; cotton; horticulture; fish/aquaculture; and livestock) are indeed of economic benefit to the smallholder farmers who are majority of the population and very many other actors along the various value chains. The analysis clearly puts coffee in first overall ranking position with score 110 or 78.6%, followed by livestock and cassava in the second ranking positions with each total score of 109 or 77.9%, maize in the third position with total score of 107.5 or 76.8%, common beans in the 4th position with a total score 106 or 75.7%, upland rice in the firth position with total score of 104.5 or 74.6%, sweet potato in the sixth position with total score of 103 or 73.6%, groundnuts in the seventh position with total score of 94.5 or 67.5%, cotton in the eighth position with total score of 94 or 67.1%, soybeans in the ninth position with total score of 93.5 or 66.8%, aquaculture in the tenth position with total score of 92.5 or 66.1%, sesame in the eleventh position with total score of 92 or 65.7%, sorghum in the twelfth position with total score of 90 or 64.3%, horticulture thirteenth position with total score of 88.5 or 63.2%, millet in the fourteenth position with total score of 75 or 53.6% and lastly barley in the fifteenth position with total score of 74.5 or 53.2%.

The synthesis shows that the total scores among the commodities vary less indicating the potential and importance and uniqueness each commodity has in improve the quality of lives of the resource-constrained farmers of Uganda in the target areas. A number of the commodities may result in wider impact in Uganda such as maize, beans, cassava, sweet potato, upland rice, livestock, horticulture and aquaculture because of the larger area of production and wide spread production in the north and south while others like sesame, sorghum, cotton and soybeans, sunflower, groundnuts, millet and barley although grown more in the north and coffee in the south have very unique advantages in the specific areas where they perform best. The selected commodities all have good market potential in the domestic, regional and international arena at varying levels. The selected commodities are food security commodities with high nutritional qualities providing balanced diet to the consumers except for coffee, cotton and barley (but they improve farmers' purchasing power indirectly improving food security). Some are early maturing guaranteeing production twice a year while others like vegetables can be produced so many times in a year.

Some of the selected commodities can be produced in both the north and south except for upland rice, cotton, cassava, sweet potatoes, sesame, sunflower, fish and some fruits where the north had more advantage over the south. The north was noted as one region that could greatly benefit from LEAD activities in terms of availability of vast land area for cultivation; cheap labor and the returning IDP who are all eager to start life and farming in a more organized way. The commodities are all good source of income in their respective niches with good potential markets in the domestic and regional markets especially and some in the international markets. Commodities such as coffee, organic cotton and sesame are in very high demand in the international markets. For all the considered commodities, it was noted that supply was far much lower than demand both for domestic consumption and export.

All the value chains presented moderate to very good opportunities for increasing value and volume and capturing premium price so long as use of improved varieties and stocks, good agronomic practices and feed resource management, processing to various products, manufacturing into human food and animal feeds and improving linkages among the value chains are considered. The challenges for most of the value chains were limited industrial base (millet in particular and other value chains), poor post harvest handling (fish, milk and meat products, groundnuts and most of the pulses and cereals), limited infrastructures, low level of processing to other products rather than exporting raw (hides and skins, cotton and coffee) and the low level of industrial use (human food and animal feed manufacturing), low level of investments by the private as well as public sectors, low level of bankability for most crops except for commodities like livestock and coffee which are considered assets and low supply of products to meet the demand of the available industries in the country. A number of the commodities present excellent opportunities for industrial use such as cassava, meat and dairy products, sunflower, sesame, sorghum and barley. All commodities are important to the economy of Uganda varying degrees and there is prospect that they could become important in the future with improvement in their industrial use. In all, producing to meet demand has been a big challenge and quality control has been very limited.

For all the commodities considered, participation of producers/farmers and a wide range of actors have been recognized including the roles and responsibilities of the following of seed companies, NGOs, CBOs, research institutions, NAADS and other extension services, agro-input supplies, processors, food and feed manufacturers, traders, exporters, transporters, the vulnerable groups (including women and youth) and the consumers. In most cases it was recognized that the linkages between the various actors was weak to foster greater production or some of the actors lacked capacities to efficiently carry out activities efficiently along the value chains like the lack of expertise in fish farming sited as a major hindrance to fish farming in Uganda and the lack of participation by investors in fish farming making fish farming remain at subsistence level despite the increasing demand.

In all cases, LEAD goals and aims are inconformity with GoU development strategies as indicated in PEAP, PMA, PRDP, privatization, decentralizations and other strategies as outlined in CAADP and IEHA. All the commodities have remained important in Uganda's agricultural economy to varying degrees as major sources of food security, foreign income, household income and providing employment to very large sector of

the country. Supporting increased production of these commodities in terms of quantity and quality will go a long way in seeing that poverty is eliminated in the country.

4.2 Recommendations

It is noted that not all commodities are equally the same in all aspects but have very important influences on the lives of those who are much involved in their production. Production of the commodities are low and of very poor or questionable quality and may not effectively compete in the open market especially the export markets where regulations and requirements are very stringent. The following are recommendations that have emerged out of the synthesis of the report:

(j) The highest ranked commodity was coffee (score 110 or 78.6%), followed by livestock and cassava (109 or 77.9%), followed by maize (107.5 or 76.8%), common beans (106 or 75.7%), upland rice (104.5 or 74.6%), sweet potato (103 or 73.6%), groundnuts (94.5 or 67.5%), cotton (94 or 67.1%), soybeans (93.5 or 66.8%), aquaculture (92.5 or 66.1%), sesame (92 or 65.7%), sorghum (90 or 64.3%), horticulture (88.5 or 63.2%), millet (75 or 53.6%) and lastly barley (74.5 or 53.2%). The variation in the total scores are not much mostly affected by market potential (medium to high for sorghum, millet and groundnuts) and high for all others; food security being high for all except soybeans, barley, sunflower, coffee and cotton; impact on income being high for all except millet and barley; use of productive resources in project areas low to medium for cotton, millet, sorghum and barley; bankability being low for all except for livestock, coffee, cotton and sunflower. Increasing value and volume had high potential for all except millet, barley, sunflower and sesame. Integration of producers and participation of a wider range of beneficiaries had very high potential for all commodities;

(k) Many actors in the value chains especially the producers lack expertise essentially required in production and marketing of the commodities (a case in point is fish farming but equally applies to all commodities);

(l) Encourage the use and adoption of improved high yielding crop varieties and animal breeds;

(m) Encourage the adoption and use of improved crop, livestock/feed and fish management practices;

(n) Need to build sustainable seed supply system that will deliver high quality seed and meet the market requirements through support to formal and informal seed sector and NSCS

(o) Post harvest challenges including storage and transportation should be considered as they most affect quality of products especially milk, meat, and fish products and also the crops (aflatoxin issues, pests, etc);

(p) Increasing utilization base and processing of most of the crops will attract investors into the value chains;

(q) Encourage linkages between the commodity value chains for better synergy;

(r) Support should also be given to development of sustainable linkages among the actors within a value chain and encourage wider participation of many beneficiaries;

(s) Lastly, although the commodities have been ranked and their positions noted relative to one another, some of the VCs ranked low may also have impact on the livelihoods of the small targeted communities producing them which should also be looked at when allocating resources. It is true the highly ranked commodities may have much wider impact on the communities producing them and should be given more priorities but even the low ranked ones should be considered for support. LEAD should consider support to all the commodities with higher priorities to those ranked high as those ranked low may also possess futures which could be of benefit to the target communities producing them.

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ANNEX 1: MATRIX SUMMARY OF COMMODITY VALUE CHAIN PRIORITIZATION FOR LIVELIHOODS AND ENTERPRISES FOR AGRICULTURAL DEVELOPMENT (LEAD) UGANDA PROJECT

CEREALS (UPLAND RICE, MAIZE, SORGHUM, MILLET AND BARLEY), OIL SEEDS (SUNFLOWER AND SESAME), PULSES (COMMON BEANS, GROUNDNUTS AND SOYBEANS)

Selection Criteria	Cereals (Upland Rice, Maize, Millet, Sorghum and Barley)	Oil Seeds (Sunflower and Sesame)	Pulses (Common Beans, Groundnuts and Soybeans)
Market Potential	• **Medium to high (Maize = 8.5; Upland Rice = 8.5; Sorghum = 6.0; Millet = 5.0; Barley = 5.0)** • Medium potential for sorghum, millet, and barley and high potential for upland rice and maize • Very high domestic and regional market potential for rice and maize (East, Central and Southern Africa countries) and for relief supplies • Demand for maize and rice in the domestic is very strong and growing and good in the regional markets • Consumption needs in the country is far more than supply and the situation is worsened by border trade between Uganda and Kenya, Sudan, DRC and Rwanda as prices for the two	• **High (Sunflower = 8.5; Sesame = 8.0)** • Market potential is high • High demand for seeds by producers • Very high demand for sunflower grains by oil processors beyond supply • Sunflower seeds currently imported from South Africa • High demand for sesame in the domestic and international markets (Turkey, Europe, Far East Asia, USA) • High demand for oil in the domestic and regional markets (Sudan and DRC) • Exported 168,000 MT of sesame worth US $ 5,455 million	• **High (Common beans = 8.5; Groundnuts = 6.5; Soybeans = 7.5)** • High market potential in the domestic and regional markets • Very high demand in the domestic markets for beans (schools, prisons, military, hospitals and the households) • High demand for all in the regional markets (Sudan, DRC, Kenya, Mozambique, Malawi, Zambia and Rwanda) and relief supplies • Of recent high demand for beans for caning to the tune of 50,000 MT per season (ACOS based in Italy) and 1,000 MT of soybeans per month (WhiteKnight Group Limited) • Huge market in Southern Africa for sugar beans

	commodities continue to rise worldwide. • Kenya and Southern Sudan are the long-term markets for Uganda maize (100,000 – 150,000 MT annually) • Largest formal (US $ 93 million) and informal (US $ 4 million) import for rice • Millet is second most important cereal in the north mostly important in the domestic market (market is underdeveloped) • Sorghum and barley in high demand for brewing beer and the supply is far less than demand (NBL using "Epuripur" sorghum to make Eagle beer and UBL using barley)		• Beans ranked third in terms of export volume and eighth in terms of export value among the non-traditional export crops. • Groundnuts has good prospects for export but quality issues need consideration
Impact on Food Security	• **Medium to high (Maize = 8.5; Upland Rice = 6.5; Sorghum = 6.0; Millet = 6.0; Barley = 1.5)** • Rice and maize are important food security crops. • They are major sources of carbohydrates and high quality protein (QPM maize) • They are important in the rural and urban areas	• **Low to Medium (Sunflower = 2.0; Sesame = 5.0)** • Low to Medium potential • Sunflower important for extraction of oil by local and large scale processors • Sesame used locally for extraction of oil • Both can be consumed raw or roasted or made into	• **Medium to High (Common beans = 9.0; Groundnuts = 7.0; Soybeans = 4.0)** • Beans are the most widely produced and consumed legume in Uganda • All 3 pulses are good sources of cheap protein and amino acids • Beans are also sources of calories, crude fiber, minerals (zinc and iron)

	• They are the major staple food crops for rural and urban households, institutions (schools, hospitals, prisons, military), internally displaced persons and refugees • Sorghum and millet are important food security crop for the semi-arid areas and mostly eaten in combination with cassava • Millet has high amino acid and essential ingredients for baby food • Sorghum and millet used as porridge in the west mostly • Barley is not traditionally consumed but used for brewing (producers are empowered through income generation)	paste • Sesame used more for making paste and in backery • They can be very good substitute for imported palm oil	• Soybeans and groundnuts are also good sources of oil • Due to their short growth duration of two and half to three months, they are important food security crops (very good during the time of famine) • They are the major staple food crops for rural and urban households, institutions (schools, hospitals, prisons, military), internally displaced persons and refugees • Mostly produced by women to generate food and income, why called women's crops
Impact on Incomes	• **Medium to high (Maize = 7.5; Upland Rice = 8.0; Sorghum = 6.5; Millet = 5.0; Barley = 4.0)** • Maize and rice are non-traditional cash and export crops • They provide employments to traders, millers, exporters and transporters making them important crops for	• **High (Sunflower = 7.0; Sesame = 6.0)** • High demand for sunflower seeds for large scale extraction of oil (Mukwano Group) which oil are sold locally and also to Sudan and DRC • There are many small scale millers extracting oil which also end up in Sudan	• **High (Common beans = 8.0; Groundnuts = 7.5; Soybeans = 7.0)** • These pulses have evolved from traditional subsistence crops to market-oriented crops with major impacts of household income • Significant source of income to the rural households especially the women and

	income generation • Export value of maize in 2007 was US $ 23.8 million and farmers reaped US $ 9 million from rice and saved the country US $ 30 million in foreign exchange earnings • Maize and rice are farmed by over 400,000 and 60,000 producers/farmers, respectively • With rising maize and rice prices, production is most likely to increase and therefore income to chain actors • Millet and sorghum are sources of income in the domestic markets and millet lack organized marketing • Sorghum and barley are source of income in brewing industries • Barley can be an import substitution crop for imported barley	and DRC • Ready market for sesame in the domestic and export markets • Demand for sesame is far higher than supply • Local oil processors also raise money from sale of oil extracted from sesame • Both small and large scale processors use more sunflower for extraction of oil than sesame which byproducts are used as animal feeds • Both are source of cash for many smallholder farmers in the north	youth who are most involved in their production • Great demand in the domestic as well as the regional markets (DRC, Kenya, Rwanda, Sudan)
Location-specific Advantage	• **Medium to High (Maize = 7.0; Upland Rice = 8.0; Sorghum = 7.0; Millet = 7.5; Barley = 6.0)** • Maize in widely produced in Uganda while upland rice is traditionally grown in	• **High (Sunflower = 7.5; Sesame = 8.0)** • The north, northwest and northeast (greater north) have the best agro-ecology for production of sesame and sunflower	• **High (Common beans = 8.0; Groundnuts = 8.0; Soybeans = 8.0)** • Beans can perform well both in the north and the south but regional preferences for beans

	eastern and northern Uganda with substantial production of recent in western Uganda • Millet and sorghum are also mostly grown in northern and eastern Uganda with substantial production in western Uganda • The above cereals have more advantage of expanding production in the north due to availability of land, cheap labor, good growth conditions, they fit well in the farming system, the resettlement of IDPs and availability of markets in DRC, Sudan, Rwanda and Kenya • Barley is mainly grown in the cool, high altitude areas of Kapchorwa district with limited production in Kanungu, Kabale and Mbale districts	• They can also be produced in a few places in the mid west • Vast land area, cheap labor and good agro-ecological conditions and dry period immediately after harvesting which allows for drying make the north the most advantaged region for production of the 2 crops	among the people of Uganda are common (the south and north prefer different varieties for consumption although for marketing the varieties may be the same depending on demand) • Best producers of beans are western and northern Uganda • Soybeans perform best in the eastern and northern part of Uganda • Northern Uganda is the largest producer and provider of groundnuts in Uganda • Availability of land and labor and good growing conditions make the north suitable for production of the pulses especially soybeans and groundnutss while beans can take advantage of both the north and south • They fit well in the northern farming system where they are intercropped with cereals, root and tuber crops.
Increasing Value	• **Medium to High (Maize =**	• **Medium (Sunflower = 5.5;**	• **High (Common beans =**

and Volume of Marketed Products	**8.0; Upland Rice = 8.0; Sorghum = 6.5; Millet = 5.0; Barley = 5.0)** • Potential is very high for maize, rice and sorghum and medium for millet and barley • The use of high yielding maize hybrids (yield increase from 2 tons OPV to 7-9 tons/ha hybrid) or improved OPV (yield increase from 1-2 to 5 tons/ha) and application of good agronomic practices could increase value and volume • Demand for rice, interest to grow rice and use of high yielding NERICA varieties and good agronomic practices could increase value and volume • There is need to increase utilization base of millet and sorghum to attract investment and increase demand so that value and volume are increased • For barley, millet and sorghum, there is need to develop many adaptable varieties and good agronomic practices • LEAD to invest in breeder	**Sesame = 5.0)** • Potential is high in the north • Availability of large fertile land, cheap labor and favorable agro-ecological conditions favor increased production of sesame and sunflower • The use of locally adaptable varieties and good agronomic practices can also increase value and volume • High demand for grain for extraction of oil and in the export markets and ready domestic markets are incentives for production of the two oil crops • Need to invest in variety and other technology development and seed production (breeder and foundation seeds)	**8.0; Groundnuts = 7.0; Soybeans = 7.5)** • Improve value and volume by use of high yielding, pest resistant varieties acceptable for consumption and markets and good agronomic practices • Extending production of the pulses to cover more areas of the north where there is vast land and cheap labor can increase value and volume • Improve capacities of producers in application of good agronomic practices and post harvest handling and storage • High demand and availability of domestic and regional markets are incentives to increase value and volume of marketed products • Add value through canning of pulses (beans) and increase utilization base of soybeans and groundnuts • LEAD to invest in enhancing skills and knowledge of producers in production and marketing and production of

	and foundation seed production		breeder and foundation seeds
Value Addition, Premium Price Capture and Industrial Use	• **Medium to High (Maize = 7.5; Upland Rice = 7.5; Sorghum = 5.5; Millet = 4.0; Barley = 5.0)** • Potential is high if their utilization base could be increased and also linked to industrial use especially barley, millet and sorghum • Main problem with maize and rice has been post harvest handling in terms of milling • Rice: There are 8 medium size mills, 1 large scale processor and 185 small scale millers with total milling capacity of 143,000 MT of rice • Milling maize into first class flour and producing aromatic rice will improve premium price capture in the domestic and regional markets • For all cereals, diversifying utilization base in the food and feed industries, bakery, breweries and extraction of oil (maize) would attract premium price	• **High (Sunflower = 8.0; Sesame = 7.5)** • The oil extracted is used for cooking and industrial manufacture of soap • The oil from both can be used in bakery and for other industrial products • Organic sesame captures premium price • By products used for making animal feeds • Premium price capture is mostly by processors • Investment is required in value addition for the two crops	• **Medium (Common beans = 5.0; Groundnuts = 5.0; Soybeans = 6.5)** • There is opportunity for canning beans which are greatly demanded by many institutions (schools, military, hospital, prisons and refugees) • Purchase of canned beans and other products have greatly increased in Uganda with establishment of many supermarkets • Improved post harvest handling and proper storage can improve premium price capture • Potential for value addition exist in making groundnut paste, defatted groundnuts, blanched groundnuts, roasted and salted groundnuts and coated groundnuts (aflotoxin issue needs to be looked at) • Soybean processing to add value for human consumption and animal feeds is great
Private	• **Medium to High (Maize =**	• **High (Sunflower = 8.0;**	• **High (Common beans =**

Sector/Producer Linkages	**8.0; Upland Rice = 8.5; Sorghum = 7.5; Millet = 5.0; Barley = 7.5)** • Rice, maize, millet, sorghum and barley are all grown by smallholder farmers in less than 0.5 ha of land on average • Seeds companies (14 seed companies) contract farmers and farmer groups to produce seeds for them which are then sold out for further production • Producers also feed the millers with grains • Traders and exporters procure the un-milled or milled grains for trading • Milled rice and maize are marketed locally or regionally • Millet and sorghum flour are mostly marketed locally with some being marketed in Sudan and DRC • Other private sectors involved in the linkages are food and feed manufacturers, local brewers, grain millers, NGOs, CBOs, grain traders and exporters and NBL	**Sesame = 7.5)** • Sesame and sunflower are produced by small-scale farmers • Seed companies (FICA Seeds, Victoria Seeds, NASECO, East African Seeds) are involved in contractual production and marketing of seeds • Processors procure the seeds from producers which are used for extraction of oil and manufacture of other products such as soap • Exporters such as SHARES purchase from producers and export to international markets • The by-products are used for manufacture of animal feeds • There is need to involve many active private sectors and enhance capacities of the producers and private sectors to create sustainable linkages	**8.0; Groundnuts = 7.5; Soybeans = 7.5)** • Pulses are produced by smallholder farmers on less than 0.5 ha of land (the main hub in production of pulses) • Seed companies produce seeds through contractual arrangement with producers • Traders and exporters purchase grains from producers • Farmers produce grains which are sold to food and feed processors • Food processors (East African Basic Foods, Kayebe Source Packers, SESACO, Maganjo Grain Millers and MARITAS Foods Limited) and feed processors (NUVITA, Ugachick Poultry Breeders, Formular Feeds Limited and Biyinzika) procure grains from producers to add value • Need for LEAD to support the linkages and ensure production is sustainable

	• LEAD should encourage and strengthen the linkages and provide an easy path for entry		
Leveraging Private/Public Sector Investment	• **Medium to High (Maize = 8.0; Upland Rice = 8.0; Sorghum = 7.5; Millet = 5.0; Barley = 6.5)** • NARO is involved in technology development and promotion • NAADS in advisory activities while MAAIF in policy issues • Seed companies in production and marketing of seeds • Value addition – milling (grain millers), brewing (NBL and UBL), human food (Maganjo Grain Millers, Kasawo Grain Millers) and animal feed (Ugachick Poultry Breeders, Bright Chick, Kenya Animal Feed) manufacturing • LEAD should support leverage of the private and public sector investment to increase production and generation of income and ensure food, nutrition and income security	• **High (Sunflower = 7.5; Sesame = 6.5)** • Many participants are involved in the value chain • NARO is involved in development of improved varieties and good agronomic practices and dissemination of the practices • NAADS is investing in advisory services and capacity enhancement • MAAIF is involved in policy formulation • NGOs and CBOs are involved/investing in general extension services, provision of inputs and information and capacity enhancement • Seeds companies are involved in production and marketing of seeds • Processors (Mukwano, A.K. Oil and Fats Uganda) are involved and investing in procurement of seeds and	• **Medium to high (Common beans = 6.5; Groundnuts = 6.0; Soybeans = 6.0)** • NARO is involved in variety development and improved agronomic practices and promotion • NAADS is involved in advisory activities while MAAIF involved in policy issues • Seed companies through contractual arrangements invest in seed production and marketing • NGOs and CBOs encourage group marketing, capacity enhancement and input provision • Traders and exporters invest in purchase and marketing of grains/seeds • Agro-input dealers are involved in procurement and the making available of production inputs • LEAD should support leverage of the private and

		extraction of oil and manufacture of other products • There is need to create conducive environment for leveraging investment from both sectors and support interventions with the best returns	public sector investment to increase production and generation of income to ensure food, nutrition and income security
Integrating Producers/Farmer Groups into Value Chain	• **Medium to High (Maize = 8.0; Upland Rice = 7.5; Sorghum = 7.5; Millet = 5.5; Barley = 7.5)** • Cereals are mostly produced by small holder farmers either as individuals or as farmer groups • Need for support to farmers and farmer groups to enhance capacity for increased production and quality (proper post harvest handling) • Provision of production and market information • Need for organized group marketing of the products and reorient the producers to high value markets which are new or already existing	• **High (Sunflower = 7.5; Sesame = 7.5)** • Both crops are usually produced by farmers/farmer groups on slightly larger land areas in order to maximize return (why the north is more suitable for production) • Mukwano and UOSPA all involve farmers in production of sunflower on contractual arrangement • Sesame fits well in the cotton farming system which farmers are part of • Farmers are therefore well integrated in the value chain • There is need to enhance capacities of the farmers to fully take advantage of the sunflower and sesame	• **Very High (Common beans = 9.0; Groundnuts = 8.0; Soybeans = 8.0)** • Pulses are produced by small holder farmers on small plot areas of less than 0.5 ha per household • The producers in most cases have formed groups for purpose of bulk production and ease of marketing (Bala Women and Youth Seeds Producers and many others) • The producers are suppliers of pulse seeds/grains to traders, food and feed processors and exporters • They also produce seeds on contractual basis for seed companies • The producers require support to enhance the knowledge and skills in production and marketing

		value chain for better benefit	(LEAD to provide support)
Participation by a wider range of beneficiaries, including Women and Vulnerable Groups	• **Medium to High (Maize = 8.0; Upland Rice = 7.5; Sorghum = 7.0; Millet = 6.0; Barley = 5.5)** • Cereals are produced by small holder farmers who are mostly women and youth • Need for coherent partnership among the value chain actors for better sharing of benefits right from production through processing to marketing and consumption • Other beneficiaries in the cereal value chain are seed companies, processors and millers, traders, food and feed processors, breweries, NGOs and CBOs, and the consumers • Cereals are major source of carbohydrates and income to a number of beneficiaries • Vulnerable groups can also benefit as well as disabled (milling, shelling, bird scaring, etc) • Need to apply similar strategies such as NANEC that involves all stakeholders	• **High (Sunflower = 7.0; Sesame = 6.5)** • Producers are involved in production of seeds in most cases through contractual arrangement with seed companies • Producers or farmer groups include women and youth • Exporters (SHARES) purchase seeds from producers and export • Processors (Mukwanu) purchase seeds from farmers and extract oil • IDPs are also involved in sunflower/sesame production • Provide conducive environment for participation of wider range of beneficiaries	• **High (Common beans = 8.5; Groundnuts = 8.0; Soybeans = 7.5)** • Farmers or farmer groups or producers of pulses are mainly composed of women and the youth (why called women's crops) • Most of the operation labor for production and marketing are provided by women and youth • Pulses are the major source of income, nutrition and food security for households • Other beneficiaries involved in the value chain are traders, seed companies, processors, NGOs, CBOs and agro-input dealers • Beneficial in rotation and intercropping with other crops such cereals as they improve soil fertility • Due to high nutritional value of the pulses, vulnerable groups such as those with HIV/AIDS and those in IDPs are also beneficiaries • LEAD to ensure wider

	in the value chain strongly with defined roles and actions		participation of beneficiaries in production and marketing of pulses
Highest Use of Productive Resources in Project Area	• **Medium to High (Maize = 7.5; Upland Rice = 8.0; Sorghum = 5.5; Millet = 5.0; Barley = 4.5)** • Maize is widely grown in Uganda while rice, millet and sorghum perform well in the northern and eastern Uganda with substantial production in the west. • Northern region can be an area for expansion of production of cereals (maize, upland rice, millet and sorghum) • North has generally flat light sandy soils, easy to open and suitable for extensive production; low labor cost; relatively good communication network and availability of markets in DRC, Sudan and Kenya gives the north advantage over the south for increase in production • The rest of the country have two advantages of good road network and better access to other services such as	• **Medium (Sunflower = 6.0; Sesame = 6.5)** • Both crops are produced organically fetching good price • Better performance under fertile soils although can tolerate marginal soils • They perform best in the greater north compared to the south • Nectar from the two makes the best honey (why honey from the north are liked) • Availability of land and cheap labor coupled with good agro-ecology make the use of resources more advantageous in the north	• **High (Common beans = 7.0; Groundnuts = 7.0; Soybeans = 7.0)** • Beans can be produced across the country with high production in the north and west • Groundnuts and soybeans are better suited for production in the northern and eastern part of Uganda • Extension of production is possible in the north and north eastern Uganda due to availability of land, cheap labor and relatively good road network to the nearest markets in DRC, Sudan, Rwanda and Kenya • Climbing beans which are higher yielding than bush beans and require less land and in high demand in the export market (European and southern African markets) is more suited for production in highlands of western and eastern Uganda • LEAD to invest resources where return to investment

	electricity and the increasing demand for cereal products • Barley remains a main domain of the cooler, high altitude areas		will be highest and the north gives some over edge advantage in terms of pulse production
Potential for "Bankability"	• **Low to medium (Maize = 2.5; Upland Rice = 2.5; Sorghum = 3.0; Millet = 1.5; Barley = 3.0)** • Producers are most likely to benefit less from financial institutions in terms of credit but may benefit from warehouse receipts if they are organized into producer organizations • Widening utilization base of cereals may increase demand and need to increase production and therefore, need for financial support or credit access • Processors (millers and brewers) are more likely to access credit facilities easily	• **Low to medium(Sunflower = 4.0; Sesame = 3.0)** • Formation of out grower schemes and warehouse receipts can benefit producers to access credits • Processors are better placed to access credits than producers • Microfinance scheme targeting producers can be a possibility of improving access to finance/credit	• Low to medium **(Common beans = 2.0; Groundnuts = 2.0; Soybeans = 2.0)** • Producers are most likely to benefit less from access to commercial credits from microfinance or banks due to the nature of the credits and their repayment policies • Exporters and traders are more likely to access such credits although it has not been easy for then either • The formation of farmer groups may help take advantage of Warehouse Receipt System to improve quality and access to finance
Importance in Uganda's Agricultural Economy	• **Medium to High (Maize = 8.5; Upland Rice = 6.0; Sorghum = 5.0; Millet = 4.5; Barley = 3.5)** • Cereals are food security and nutrition crops and good source of income	• **Medium (Sunflower = 5.5; Sesame = 5.0)** • Both are important in the economy of Uganda • The seeds are used for extraction of oil sold in the domestic and foreign	• **Medium to High (Common beans = 8.0; Groundnuts = 5.0; Soybeans = 5.0)** • These are traditional subsistence crops which have evolved to market oriented modern crops with major impact on household

	• Maize has become a major non-traditional cash and export crop and over the last 10 years average export earnings have averaged US $ 18 million annually • Rice has saved Uganda US $ 30 million worth of import in foreign exchange earnings • Sorghum and barley are income earners in the breweries	markets earning foreign exchange • Assured market although the premium price mostly benefits the processors • The byproducts used for manufacture of animal feeds • Can be integrated with apiary for production of high quality honey as source of income for farmers	food and nutrition security and household income • They are foreign exchange earners • Have huge market potential domestically, regionally and internationally if quality can be controlled.
Confluence with GoU (PRDP, PEAP, PMA), CAADP, IEHA Goals	• **Very High (Maize = 10.0; Upland Rice = 10.0; Sorghum = 10.0; Millet = 10.0; Barley = 10.0)** • In conformity with GoU PEAP, PMA, PRDP, CAADP pillars 2,3, 4; IEHA pillars 1, 2, 3, 4, 5.	• **Very High (Sunflower = 10.0; Sesame = 10.0)** • In conformity with GoU PEAP, PMA, PRDP, CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.	• **Very high (Common beans = 10.0; Groundnuts = 10.0; Soybeans = 10.0)** • In conformity with GoU PEAP, PMA, PRDP, CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.
TOTAL SCORE	• **Maize = 107.5** • **Upland Rice = 104.5** • **Sorghum = 90.0** • **Millet = 75.0** • **Barley = 74.5**	• **Sunflower = 94.0** • **Sesame = 92.0**	• **Common Beans = 106.0** • **Groundnuts = 94.5** • **Soybeans = 93.5**
SCORE AS PERCENTAGE	• **Maize = 76.8%** • **Upland Rice = 74.6%** • **Sorghum = 64.3%** • **Millet = 53.6%** • **Barley = 53.3%**	• **Sunflower = 67.1%** • **Sesame = 65.7%**	• **Common Beans = 75.6%** • **Groundnuts = 67.5%** • **Soybeans = 66.8%**
RANK POSITION	• **Maize = 3**	• **Sunflower = 8**	• **Common Beans = 4**

	• **Upland Rice = 5** • **Sorghum = 12** • **Millet = 14** • **Barley = 15**	• **Sesame = 11**	• **Groundnuts = 7** • **Soybeans = 9**

ROOT AND TUBER CROPS (CASSAVA AND SWEET POTATO), COFFEE, AND COTTON

Selection Criteria	Roots and tubers (Cassava and Sweet Potato)	Coffee	Cotton
Market Potential	• **High (Cassava = 8.0; Sweet Potato = 7.5)** • Cassava has medium to high market potential in the short term with increasing importance in the long term • Domestic markets present much higher potential than regional and international markets • Wide range products for domestic markets from fresh roots and leaves to processed products while regional markets demand for high value processed products • Sweet potato – medium to high • Uganda the second largest producer after China • Very high in the domestic market with increasing importance in export markets • Increased export of fresh SP to EU estimated at 12 MT monthly (US $ 400,000)	• **High = 9.0** • Long-term prospect for coffee expansion in Uganda is very good • High demand in the domestic, regional and international markets • Domestic demand for processed coffee is high • There is high potential for generation of foreign exchange • The leading foreign exchange earner in Uganda • Uganda's estimated income from coffee in 2007 stood at US $ 642 million/year but realized only US $ 257 million in the same year due to diseases (Coffee Wilt Disease/CWD)	• **High = 8.0** • High market potential although minimal production with estimated production up to 500,000 bales of cotton every year • Potential to tap in the AGOA market is high • Opportunities exist in value addition, spinning, textile, oil, animal feeds • Opportunities exist in local industries for manufacture of many products including blankets, mats, carpets, toilet tissues, writing papers, cotton wool, x-ray films, photographic films and upholstery padding • Opportunity to make bio-fuel from cotton exists

	• EU Markets offer highest return per unit		
Impact on Food Security	• **High (Cassava = 8.5; Sweet Potato = 8.5)** • Cassava and sweet potato (SP) are the second and third most important starchy staple food crops after banana, respectively • Major source of food to majority of the rural based especially in the north and north east • They are widely cultivated in Uganda because they store well in the soil, withstand extreme weather conditions (drought), have short growth period (SP) and yield well with limited inputs or on relatively marginal soils • Mostly grown by resource poor farmers • They are famine security crops essential in times of disaster • SP precursor of vitamin A (orange flesh) (prevention of eye disease) • 30-50% of population consume orange flesh SP	• **Low = 2.5** • Not directly • Diversification of source of income for producers • Higher income for producer • Improves purchasing power of producers	• **Low = 1.5** • Does not contribute directly • Contributes to cash security which improves the purchasing power of households improving on food security • A rotational crop with staples such as cereals (millet follows cotton in rotation)
Impact on	• **High (Cassava = 8.5; Sweet**	• **Very high = 9.0**	• **High = 7.5**

Incomes	**Potato = 7.0)** • Cassava and SP are rural based and main source of income • Cassava is increasingly becoming an industrial crop in the field of pharmaceuticals, textiles, animal feeds, breweries, plywood and starch products • SP survey indicates that farmers can earn between US $300-500 per ha per annum (net margin of 67-72% of the cost) • For both planting materials (stems and vines) have good markets boosting farmers' incomes	• High value perennial crop for over 500,000 smallholders • It has a well established marketing structure • Income per unit area per annum is very high • Uganda Rubusta receives premium price worldwide • Current market price trend is very good • Coffee is low-input perennial crop and can withstand marginal growth environmental conditions • Coffee is easy to handle in the dry form ("Kiboko") and this ensures minimal losses	• Farmed by about 300,000 low-income households • Usually a first crop in the rotation and fits well in the cropping system allowing many farmers to participate • Can be intercropped with other crops reducing risk of crop failure • Contributes directly to Uganda export revenue and employment • The market for Uganda cotton is still good and promising especially organic cotton • A major cash earner for smallholder farmers in the north
Location-specific Advantage	• **High (Cassava = 8.0; Sweet Potato = 7.5)** • Cassava and SP are widely cultivated in Uganda as they store well, withstand extreme weather conditions and yield well with relatively limited inputs (less production of cassava in the cooler highlands of western and eastern Uganda) • Cassava and orange flesh sweet potato perform relatively	• **High = 9.0** • Best suited in the south • Mostly produced in central and western Uganda characterized by most desired agro-ecologies for production • Where coffee is produced, there are better infrastructures (institutional, financial and markets) and access	• **High = 8.5** • Most suitable production environment is the greater north right from West Nile through Acholi, Lango to Teso region • The north is also currently producing organic cotton which has premium price in the world market • Availability of fertile land, cheap labor, suitable agro-

	better in the greater north and north-east than the rest of the country • Other SP varieties perform generally well across the country • Availability of land, cheap labor, good environmental conditions and ready markets in Sudan and DRC give the north an added advantage over the south in production of cassava and SP	to services that drive the coffee industry forward • Therefore, central and southern Uganda becomes very ideal locations for production of coffee in Uganda. • Arabica coffee on the other hand performs well in the highlands of West Nile (Nebbi District), eastern highlands (Sironko, Mbale and Kapchorwa districts) and western highlands.	ecologies and favorable policies favor production in the greater north • Its position in rotation makes it a favorable crop for production
Increasing Value and Volume of Marketed Products	• **High (Cassava = 8.0; Sweet Potato = 7.5)** • SP and cassava's ability to produce good yield under relatively marginal conditions, flexible planting and harvesting time and their good yield response to better management practices have been incentives for their expansion in volume • Increasing the product base (flour, potent gin, starch, fructose and maltose, glucose and juice) for cassava and SP has been an incentive to increase value and volume • Use of improved high yielding varieties resistant to pests and	• **Potential is high = 8.0** • Adoption of appropriate CWD resistant varieties, pest and disease control practices, soil and canopy management practices, and proper post harvest handling and processing recommendations are likely to increase value and volume • Opportunity for processing and the current good price trend are incentives for increased value and volume of marketed product	• **High = 7.0** • High for volume and value if correct varieties, proper agronomic practices and agro-inputs are used • Use of animal traction to increase land area is another possibility to increase volume • Demand for cotton is high yet production is low an incentive to increase volume • Increase value through increasing number of certified organic cotton producers • Use of correct varieties

	diseases and application of good agronomic practices and enhancement of farmer skills and knowledge in production and marketing can result in increased value and volume		with desired fiber qualities and proper agronomic management practices will increase value and volume
Value Addition, Premium Price Capture and Industrial Use	• **High (Cassava = 7.5; Sweet Potato = 7.0)** • Development of sun-dried cassava and SP products such as chips for longer storage period for consumption and marketing during long dry spell adds value • Opportunities in Cassava: Development of flour (gari), potent gin (waragi), starch, high fructose and maltose in breweries, glucose and sucrose in pharmaceuticals and bakeries and animal feeds • SP opportunities: Development of composite flour, starch and high value snacks, use in bakeries, juice making, confectionaries and making herbal soap • There is potential role of cassava in bio-fuel as global fuel crisis hits	• **High = 8.0** • Potential for vale addition through processing (roasted coffee, instant coffee) is high in the medium to long term • Most of Uganda's coffee is exported unprocessed • Proper post harvest handling can improve premium price capture • There is great demand for Uganda Robosta coffee	• **High = 7.0** • Potential is medium to high • High value for organic cotton especially if the number of organic farmers could be increased • Increase ginning capacity to improve spinning • Processing to yarn, processing cotton seeds to oil and animal feed can result in premium price
Private Sector/Producer Linkages	• **Potential is high (Cassava = 7.5; Sweet Potato = 7.5)** • Many actors are involved in root and tuber value chain	• **Potential is high = 8.0** • Areas where linkages have the highest potential are in multiplication and	• **Potential high = 7.5** • A number of actors are involved including producers, traders

	• Production is mostly by small holder farmers • Many actors (private sectors) involved in value addition who procure the necessary roots and tubers from the producers therefore requiring much better linkages for sustainable production and supply • Some of the private sectors involved are NGOs and CBOs (BUGADEV, VEDCO, SG 2000), food and feed processors (Kasawo Grain Millers, Maganjo Grain Millers, Ugachick Poultry Breeders), breweries, exporters (HORTEXA), tool fabricators (TONET), transporters and agro-input dealers • There is need to support the producer/private sector linkages in order to maintain sustainability and increased production and income generation	distribution of improved planting material, soil fertility and pest management (agro-input dealers/suppliers), commercialization of specialized technologies, value addition and development of by-products, planning and policy, capacity building, • LEAD should maintain close linkage and collaboration with private sector (producers, processors, manufacturers, agro-input dealers, NGOs, CBOs, CSOs) and public sectors (NARO/COREC, UCDA) in pursuit of improving coffee production and export in Uganda.	(BOWEEVIL, Olam, and DUNAVANT), ginners (DUNAVANT and Uganda Cooperative Societies), transporters, manufacturers of textiles (Phonex) and exporters (BOWEEVEIL, DUNAVANT, Olam) • BOWEEVIL and DUNAVANT have very good contractual arrangement with producers or farmer groups for production of organic and conventional cotton, respectively • Create conducive atmosphere for involvement of many actors and enhance their capacities to maintain the established linkages and also create more sustainable linkages between producers and private sectors
Leveraging Private/Public Sector Investment	• **Medium to High (Cassava = 8.0; Sweet Potato = 7.0)** • Many private and public sectors are already involved in the cassava and SP value chains • Private sectors are involved in processing foods and	• **Medium = 6.0** • Currently low private sector investment • Private sector is expected to invest more in coffee industry in various areas including seedling	• **Medium = 5.5** • NARO currently involved in development of desired varieties and agronomic practices • BOWEEVIL invests in capacity enhancement and

	feeds(Kasawo Grain Millers, Maganjo Grain Millers, Ugachick Poultry Breeders), making potent gin (breweries), fabrication of tools (TONET), agro-inputs, and technology dissemination and capacity enhancement (NGOs and CBOs) • Public sectors likewise are involved in development and promotion of technologies (NARO), advisory services (NAADS), policy issues (MAAIF) and information dissemination on markets (UEPB) • Need to invest in both public and private sector activities to increase value and volume and premium price capture and income	provision, agro-input provision, capacity enhancement, processing and marketing • Increased production and good price is expected to be an incentive to private investors • NARO and UCDA are investing in technology development and dissemination • A number of private sectors are willing to invest in production, processing and marketing so long as coffee price remains promising	marketing of organic cotton • DUNAVANT through expansion of production and support to extension services and marketing of cotton • Other opportunities exist in commercial production on large scale using irrigation, investment in extraction of oil and making animal feeds • Also investment in production and marketing of suitable agro-chemicals
Integrating Producers/Farmer Groups into Value Chain	• **High (Cassava = 8.5; Sweet Potato = 7.5)** • The role of producers or farmers or farmer groups in the value chain has been well recognized as producers of roots and tubers • Cassava developed a strategy called NANEC which involved all stakeholders in the value chain • NANEC stimulated production and increased productivity and marketing of cassava	• **Potential is high = 9.0** • Integration of producers is prerequisite for increased value and volume which is attractive to private sector investment • Integration is possible through a concerted commercialization program and formation of producer organizations (cooperatives) for	• **High = 7.0** • Medium for organic cotton and high for conventional cotton • Over 300,000 small holders are involved in cotton production • Ginners depend purely on cotton produced and sold to them by producers • Cooperative societies also depend on cotton purchased from producers

	• Producers have been more actively involved in production of planting materials (stems and vines) which have earned them income • Maintaining a system similar to NANEC could boost production/income • SP has similarly dome the same	production and marketing and taking advantage of the warehouse receipt system • Unskilled smallholder farmers are also able to be linked to various markets through capacity enhancement	• There is need to provide desired environment for integration and participation of producers/farmer groups in the cotton value chain
Participation by a wider range of beneficiaries, including Women and Vulnerable Groups	• **High (Cassava = 8.5; Sweet Potato = 8.5)** • Participation of a wider range of stakeholders in roots and tuber value chain has been the reason for wider adoption and impact of cassava and SP • Cassava and SP are predominately produced by small scale farmers (resource poor farmers) and women and youth predominate in the production • NANEC of cassava involved all stakeholders including donors and was effective • Other value chain actors include consumers, traders, processors, agro-input dealers, machine fabricators and transporters and vulnerable groups threatened with civil disorders, migration or diseases	• **Potential is high = 8.0** • Women and youth are involved in various aspects of coffee value chain • Mainstreaming gender in coffee development arena is important (Government, NGOs, CBOs) • Involvement of producers, processors and traders are essential • Others are NARO, UCDA	• **Medium to high = 7.0** • Many participants are involved in the cotton value chain • Men, women and youth are all involved in planting, weeding, thinning, picking, sorting and transportation to buying centers • Men involved more in land opening and spraying • Disables are involved in sorting • Others are NARO, agro-input stockists, ginners, oil millers and feed manufacturers • Create an environment to allow participation of a wider range of beneficiaries and create strong linkages among the beneficiaries

	• LEAD to get means of involving a wide range of beneficiaries and maintain cohesion		
Highest Use of Productive Resources in Project Area	• **High (Cassava = 8.5; Sweet Potato = 8.0)** • Cost/benefit analysis indicate that roots and tubers are viable enterprises • Although grown all over Uganda, the availability of land, labour and good soils with ready markets in Sudan and DRC and availability of vulnerable groups in the IDPs gives the north an edge over the south in production of SP and cassava • The easy export to EU markets from the south for SP can be used as a target to procure SP from the north for export if other logistics are in place • Otherwise both north and south are potential for production of the two crops with the north having an over edge advantage in production of cassava and SP than the rest of the country	• **High = 8.5** • High potential in the south • This is seen in the central and southern Uganda where coffee industry preoccupies well over 80% of the rural labor force and also the amount of land allocated to coffee production • There is a lot of provision of employment in the value chain • Coffee in most cases is intercropped with other crops resulting in more efficient use of resources and return to land and labor and avoidance of risks	• **Medium = 5.0** • Most productive in the north where there is available land and cheap labor supported by good agro-ecology • Fits well in the farming system of the north and can be intercropped with other crops • Source of income to a number of small holder farmers • But low price offered to producers is disincentives to production of cotton
Potential for "Bankability"	• **Medium (Cassava = 3.0; Sweet Potato = 2.5)** • With increasing industrial use of cassava and SP, processors and	• **Low to Medium = 5.5** • Potential for bankability is low but expected to increase with	• **Low to Medium = 4.0** • Potential is low to medium but can be improved • Producers are the most

	machine fabricators may be able to access financial assistance or credit from financial institutions • Availability of markets and domestic demand may in the long run require more investment in production so access to credits by producers although the current microfinance lending do not favor producers • Warehouse receipts may improve access to finance	improvement in value addition and processing • Formation of cooperatives may facilitate access to loans and other financial assistance • Producers can take advantage of the warehouse receipts system	affected • Areas where investors can access credit and finances are in ginning/yarn making, manufacturing of textile, oil and animal feed and other areas of value addition and processing
Importance in Uganda's Agricultural Economy	• **High (Cassava = 7.5; Sweet Potato = 7.0)** • Key starchy commodities after banana • They perform well under diverse conditions and are versatile and flexible in the cropping and food systems in Uganda • They are both important food and nutrition security crops • They are means of earning income by many smallholder farmers and source of foreign exchange by the government	• **Very high = 9.5** • Highest national foreign exchange earner (66% earning from traditional crops and 19.9% from total earnings of both traditional and non-traditional) • Provides income to many small holders • About 1.5 million families involved in various aspects of coffee production, processing and marketing	• **Very high = 8.5** • Uganda's cotton is known for its fiber quality and comparable to Egypt cotton • Third important traditional export crop after coffee and tea and earning about US $ 19,571 million a year • Provides income and source of raw materials • Cotton fits well in rotation (farming system) with other crops • Has potential for value addition to develop so many other products
Confluence with GoU (PRDP, PEAP,	• **Very high (Cassava = 10.0; Sweet Potato = 10.0)**	• **Very high = 10.0** • In conformity with GoU	• **Very High = 10.0** • In conformity with GoU

PMA), CAADP, IEHA Goals	• In conformity with GoU PEAP, PMA, PRDP, CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.	PEAP, PMA, PRDP, CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.	PEAP, PMA, PRDP, CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.
TOTAL SCORES	• **Cassava = 109.0** • **Sweet Potato = 103.0**	• **110.0**	• **94.0**
SCORES AS PERCENTAGE	• **Cassava = 77.9%** • **Sweet Potato = 73.6%**	• **78.6%**	• **67.1%**
RANK POSOTION	• **Cassava = 2** • **Sweet Potato = 6**	• **1**	• **8**

FISH/AQUACULTURE, HORTICULTURE AND LIVESTOCK

Selection Criteria	Fish/Aquaculture	Livestock	Horticulture and Spices
Market Potential	• **High = 7.0** • High prospect for long-term market potential • US and EU market demand is high and rapidly growing and estimated at its peak to be 3,614 tons valued at US Dollars 143,618,000 • EU is a major destination of fish from Uganda (approximately 70% of total Uganda fish export) • High regional demand for dry/smoked/salted fish and by-products such as fish frames, skins, oils and off-cuts in Rwanda, DRC, Sudan and Kenya • Domestic market is good as a major source of protein • Aquaculture production has remained subsistence • Declining capture fisheries means aquaculture has to fill the gap (potential is good) • Market outlook is good in medium to long term for aquaculture as	• **High = 9.0** • High domestic and export market opportunities • Livestock sector contributes 17% of the national GDP in terms of milk and meat • Cattle population has continued to grow at 4% per annum in response to increasing demand for milk and meat in the local market • Higher rates of growth are expected as the GoU continues to pursue policies for modernizing and commercializing livestock agriculture • As population increases, there is need for appropriate market-oriented production technologies	• **High = 7.5** • High market potential with long-term prospects for market expansion • Good domestic and regional markets for vegetables and fruits in the north • Daily source of income to the smallholder farmers in the rural markets • Spice production still limited • Demand for fruits in regional and international markets is high

	supermarkets provide the markets		
Impact on Food Security	• **High potential = 7.0** • Excellent source of protein for most households • Increased export to EU has resulted in reduced fish available for domestic consumption as fish price continues to rise • This creates opportunity for aquaculture to bridge the gap in the domestic requirements • In all, fish is high value product in all forms (fresh, smoked, dry and salted)	• **Medium to high = 6.5** • Livestock (cattle, goats, sheep, pig, poultry) is good source of animal protein (meat and milk) • Current per capita consumption of 40 liters of milk and 8.8 kg of meat is much lower than recommended FOA level of 200 liters and 50 kg, respectively • The gap is an opportunity that can be exploited in the domestic markets • Historical data indicates 7% increase in meat demand per annum over the last decade • MAAIF plans to increase per capita milk consumption to 60 liters by 2010 • Development of Food and Nutrition Bill is likely to provide additional impetus to increased consumption of livestock and livestock products	• **Medium = 5.0** • Major source of nutrient and vitamins with high potential to improve nutrition • Vegetables such as onions, cabbages and tomatoes and fruits such as mangos are staple • Need for short duration vegetables especially for IDPs being resettled back home
Impact on Incomes	• **High = 7.0** • High potential for impact on incomes • Demand for fish is robust and growing in the international, regional and domestic markets • Current supply is far lower than demand, therefore,	• **High = 8.0** • In the medium to long-term the potential is high • Livestock provides direct cash income (cattle, goats, sheep, pigs and poultry and livestock products such as meat, milk and skin), are capital assets, produce manure (fertilizer and fuel), and	• **High = 7.0** • Production of which is dominated by women • There is increasing demand for vegetables and fruits locally and regionally • Increased production and quality could target high

	the high price rise (the current price trend is good) • Opportunities exist in processing and marketing of fish • Fish has high value products required in all forms (fresh, smoked, dry, salted, chilled and frozen) • About 700,000 persons are directly employed in the fish sector • Total production in 2006 was 216,000 tons valued at 123 million US Dollars	source of power for transport and cultivation • Livestock impacts on over 300,000 households • There is high demand for livestock products in the domestic and regional markets (Sudan) • Dual purpose cattle can add value to farm production (meat, milk and animal traction) • Demands for meat and milk are increasing as population in the northern urban areas increases (currently demand exceeds supply) • Animal traction has increased land acreage under crop production resulting in more income to households • Milk processing and marketing provide employment for many • Income also comes from forage seed production • There is need to develop and disseminate appropriate technologies to increase market-oriented production	priced markets • Short growth period for vegetables ensures quick return to investment for producers especially the women • Need for short duration vegetables for income (IDPs) • Changing food habits of many in urban areas is demanding for more consumption of vegetables and fruits
Location-specific Advantage	• **High = 7.5** • There is wide distribution of fisheries resources country wide • Both the north and south offer high potential for	• **High = 7.5** • Livestock are found both in the north and south but the south has more organized dairy production and marketing systems • The north has potential for dual	• **High = 7.5** • Vegetables and fruits can be grown in a wide range of environment both in the north and south • North is more

	aquaculture establishment and expansion • There are available local species for aquaculture • The north has fairly good agro-ecological conditions for aquaculture farming especially with return of relative peace in the north now • Gulu, Amuru, Kitgum, Pader, Lira, Apac, Soroti and Kumi are all potential for aquaculture establishment and expansion • Availability of regional markets makes north and south both suitable for fish farming • There is possibility for cage production in areas surrounding the lakes • More expertise on aquaculture farming is required as those knowledgeable in the area are few	purpose livestock (provide meat and milk and source of power for transport and cultivation) • Increasing population in the northern towns demand for more milk and meat • The need to increase land area under cultivation in the north demands for use of oxen (also for transportation) • Regional trade exists for hides and skins • Regional deficit exists for dairy products (DRC, Sudan, Kenya, Rwanda) • Passage of the EAC Union in 2005 lowered regional import tax on dairy products • Although a lot of milk is currently produced in the south there is potential for production in the north • There is need to develop and disseminate appropriate technologies to increase market-oriented production	advantageous with suitable agro-ecology and regional demand in DRC and Sudan • Shorter growth period makes more suitable for the resettling IPDs in the north
Increasing Value and Volume of Marketed Products	• **High = 6.5** • Potential for increasing volume and value is high • There us need to improve on fish handling, preservation, processing,	• **High potential = 8.5** • Adoption and use of improved feed resource management technologies to increase milk and meat value and volume • Use of improved cattle breeds to	• **Medium = 6.0** • Is a relatively new commercial crop but taking root due to the changing feeding habits of many

	storage, and transportation to increase access to higher value markets • There is also need to link fish feed producers to other crop value chain such as grains, cassava, etc for sustainable supply of fish feeds for aquaculture farming	increase milk and meat production (over 80% of milk produced from indigenous breeds whose size is estimated at over 95% of the population, while the less than 5% of improved breeds contributes 16% of total milk output) • The rolling plains and sandy-loam soils and availability of large swamps favor the rearing of livestock and crop production (volume increase)	• Mostly marketed in the fresh form giving a lot to be desired in terms of quality • Mostly considered home garden with less incentive to improve value yet becoming highly priced • Locally can increase land area under production but quality may be compromised • Need to invest in processing to improve value
Value Addition, Premium Price Capture and Industrial Use	• **Medium opportunity = 6.0** • Value addition is still possible through improved processing into various products such as smoked fish, salted fish, dried fish and other industrial products such as oil for domestic and export markets • There is possibility of linking fish feed producers to other crop value chain (cassava and grains) • There is need for certification of fish to capture premium price in	• **Potential is high = 7.5** • Need for value addition to dairy and milk products and infrastructure development including cold storage • Improve on animal breeds (meat and milk breeds and dual purpose breeds), feed resources (forage seed production) and supply of improved stocks • Integrate livestock value chain with other crop value chain (production of animal feeds to improve production) • The region has regional airports (Arua, Gulu and Soroti) for direct supply to regional markets and niche markets in urban areas but	• **Medium = 6.0** • Medium to high but still a long way to go in terms of quality • Quality improvement is possible through varietal improvement, post harvest handling, capacity building, simple processing (proper packaging and freezing) for commercial markets

	the international markets	this requires modern abattoirs to attract investors and consumers • Need to develop leather processing industries to capture premium price • Address the challenge of poor milk quality and infrastructures	
Private Sector/Producer Linkages	• **Medium to high = 6.0** • There is medium to high potential for private sector/ producer linkages in the areas of processing, marketing and capacity enhancement • Private sectors seek additional suppliers of fish but the quality of fish still remains a big issue • A number of private and public sectors are involved in fisheries including fisher folks, NARO/NaFIRRI, NUSAF, Ekitangaala, Uganda Cooperative Alliance (UCA)	• **Potential is high = 7.0** • Mostly small holder farmers are involved in livestock production and management and they supply the required animals to traders and processors • Processors (Dairy Development Authority (DDA) and Jesa Dairy Farm and others) process milk into various dairy products • Quality cuts process beef into various meat products • Various NGOs/CBOs (Send a Cow, Heifer Project) work closely with producers and give them support • Areas of linkages include agro-input and service supply, milk collection and processing, transportation, manufacture of implements and manufacture of feeds • There is need to enhance capacities of producers to effectively produce quality products • Consider the need for infrastructures to allow	• **Low to medium = 5.0** • Vegetable and fruits mostly produced by small holder farmers • Seed companies selling seeds and agro-chemicals • Victoria Seeds has a seed processing plant in the north • Most of the vegetable seeds marketed are imported by the seed companies • Increased demand for fruits and vegetables from available restaurants and NGO/CBO communities in the north • Capacity enhancement for extension agents through University is required • Processing by private sector for commercial markets is needed

		production of quality products to capture premium price	
Leveraging Private/Public Sector Investment	• **Medium to high = 6.**5 • There is need for public/ private partnership in investments in infrastructures, services and fish processing • The industry is still in the infant stage for aquaculture • Public sector resources are very thin but private sector resources is expected to increase as demand increases with premium price capture • A number of private sectors are currently involved in processing and marketing of fish • NARO/NaFIRRI is involved in technology development and dissemination in fisheries and aquaculture	• **Potential is high = 7.0** • NARO (NaLIRRI and Mbarara ZARDI) is involved in development of disease and pest management strategies and development of vaccines and supply of improved stocks • NARO (NaCRRI) and MAK is involved in development of feed resource management technologies • Private sectors: DDA and Jesa Dairy Farm for value addition to dairy products; quality cuts for meat value addition and feed processors (manufacture of animal feeds) • Private sectors are also involved in animal breeding and supply of stocks • There is need for support in operation of modern abattoirs • Develop leather processing industries (hides and skins) as Uganda hides and skins are exported raw • There is need to improve on infrastructures to allow for improved production and marketing of livestock and livestock products (will attract both public and private investors	• **Medium = 5.0** • Vegetable and fruit industries not developed in the north although demand is high both locally and regionally (Sudan and DRC) • Currently, most private processors of vegetables and fruits are in the south but can be encouraged to procure vegetables and fruits from the north if volume and value are to increase and remain sustainable • Exporters as of now are concentrating in the south but the north is a potential with nice agro-ecology and available land • Trained horticulturists are required • Minimal investment by GoU in horticultural research

		in the value chain)	
Integrating Producers/Farmer Groups into Value Chain	• **Medium to high = 6.5** • This is possible but there is need to organize and build capacities of the producers/ farmer groups to improve on production and bargaining power within the fish value chain • There is need to improve on infrastructures such as cold storage system and transport as the demand for fish increases • There is also need to improve on expertise in fish farming which is currently very low or lacking	• **High = 8.5** • Livestock production is mostly by small to medium scale farmers and a few large scale farmers • Integration of producers in value chain is essential to increase value and volume • Enhancing producer skills in management and post harvest handling of animal products essential • Linking the producers to better markets for premium price capture is essential • There is need for smallholders to organize themselves into farmer associations in order to increase volume and value of products to supply processors. This will make management of production and marketing easy	• **High = 8.0** • Most fruits and vegetables are produced by farmers or producers • Market demand for fruits and vegetables very are high as a way to substitute for the costly imported caned ones sold in the supermarkets • Issues of concern are quality and quantity and consistent supply on a sustainable basis
Participation by a wider range of beneficiaries, including Women and Vulnerable Groups	• **Medium = 6.0** • Fisheries provide opportunities for a wide range of stakeholders in areas of fishing equipment ownership, fishing labor, fish processing, fish trade and fish farming • Fisheries co-management was established to contribute to poverty eradication through	• **Potential is high = 7.0** • Farmers or farmer groups, public and private sectors are all involved in livestock value chain • The most vulnerable groups especially the IDP and those who migrated still continue to consider livestock as source of their income and wealth • Women and youth can be trained to take advantage of draught power for transportation	• **High = 7.0** • Potential is great • Vegetables and fruits are mostly produced by farmers majority of whom are women and the youth • Other participants in the horticultural value chain includes the NAADS, NARO, NGOs, CBOs, seed companies, traders and

	participation of a wide range of stakeholders • The women and youth are all involved in fish value chain (processing and marketing) • The vulnerable groups are also included in fish value chain and disabled can participate in aquaculture farming • There is need to provide suitable environment for wide range of stakeholders to participate in the value chain	(fetching water and firewood), planting, weeding, ridging and harvesting) • Women and disabled can also be trained in calf rearing and producing pasture seeds • But consideration should be given to improving milk quality, infrastructures, pronounced seasonality of milk production, feed resources, diseases, high input costs, poor breeds and inadequate feeding and better marketing structure	to a limited extent exporters
Highest Use of Productive Resources in Project Area	• **Medium to high = 6.5** • Medium to high potential if infrastructures could be improved upon • Aquaculture could become the highest income generator especially in the rural areas • Both north and south are suitable for fish farming although the north is better placed with ample land and labor • There is need for availability of a wide range of fish species, production and processing	• **Potential is high = 7.0** • There is need to improve on infrastructures, breeds and stocks, feed resources, marketing system and value addition • The north is blessed with vast land areas for dairy and beef production, use of animal traction for land preparation and other field operation is possible as the soils are light and sandy loam, availability of cheap labor and integration of livestock in the farming system are all opportunities which can be exploited • Availability of markets in the	• **Medium to high = 6.5** • Potential is great in the north due to available land resources, labor and good agro-ecology • Advantage is that some of the vegetables mature in a relatively short period of time and may be grown a number of time in a year • The issue of quality and quantity for supply on a sustainable basis needs to be addressed

	skills, provision of support services, infrastructures and social services and marketing • Potential can be great but support services are currently low yet required	urban areas and in the neighboring Sudan and DRC	
Potential for "Bankability"	• **Low to medium = 3.0** • Low to medium as farmers or farmer groups may not easily access credit facilities • Possibilities high for processors with big investments to access credit/financial support from banks or finance institutions	• **Potential is high = 7.0** • Livestock farmers may access finance and credit more easily than crop producers as their animals are considered capital assets • Possibilities are high for processors to access credit and finance	• **Low to medium = 2.5** • Need to gain confidence in the available market for continued supply especially those from the south where large needs exist
Importance in Uganda's Agricultural Economy	• **Very high = 7.0** • Second largest foreign exchange earner • Provides incomes to many small holder farmers and other actors along the fisheries value chain • Fisheries contribute 2.2% to total GDP • Employs over 700,000 directly and over 1,000,000 indirectly • The current export earnings stand at US $ 117,364,000.	• **High = 8.5** • Among the most rapidly developing sector • Livestock contributes 17% of the national GDP in terms of meat and milk • Livestock provide direct income, they are capital assets, they produce manure for use as fertilizers and fuel and they are a source of animal power for transport and traction • In traditional economy, livestock is an indicator of savings and investment, and wealth and social security	• **Low to medium = 5.5** • Most of the fruits and vegetables grown locally are being consumed locally (domestically) • Large quantities of the canned vegetables and fruits/juice are imported into Uganda • Most temperate fruits are imported from Kenya and South Africa

		• Demand is more than supply and the current consumption of milk and meat is far below the recommended FOA level meaning more market opportunity for livestock products	
Confluence with GoU (PRDP, PEAP, PMA), CAADP, IEHA Goals	• **Very high = 10.0** • In conformity with GoU PEAP, PMA, PRDP, privatization and decentralization policies; CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.	• **Very high = 10.0** • In conformity with GoU PEAP, PMA, PRDP, privatization and decentralization policies; CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.	• **Very High = 10.0** • In conformity with GoU PEAP, PMA, PRDP, privatization and decentralization policies; CAADP pillars 2, 3, 4; IEHA pillars 1, 2, 3, 4, 5.
TOTAL SCORE	• **92.5**	• **109.0**	• **88.5**
SCORE AS PERCENTAGE	• **66.1%**	• **77.9%**	• **63.2%**
RANK POSITION	• **10**	• **2**	• **13**

ANNEX 2: MATRIX OF VALUE CHAIN PRIORITIZATION SCORE VALUE AND RANKING FOR USAID-FUNDED LIVELIHOODS AND ENTERPRISES FOR AGRICULTURAL DEVELOPMENT (LEAD) UGANDA PROJECT

CRETERIA	**CEREALS**					**ROOTS AND TUBERS**		**OIL CROPS**	
	Maize	**Upland Rice**	**Sorghum**	**Millet**	**Barley**	**Cassava**	**Sweet Potato**	**Sunflower**	**Sesame**

Market Potential	8.5	8.5	6.0	5.0	5.0	8.0	7.5	8.5	8.0
Impact on Food Security	8.5	6.5	6.0	6.0	1.5	8.5	8.5	2.0	5.0
Potential for Impact on Incomes	7.5	8.0	6.5	5.0	4.0	7.5	7.0	7.0	6.0
Location-specific Advantage	7.0	8.0	7.0	7.5	6.0	8.0	7.5	7.5	8.0
Potential for Increasing Value and Volume of Marketed Product	8.0	8.0	6.5	5.0	5.0	8.0	7.5	5.5	5.0
Potential for Value Addition, Premium Price Capture and Industrial Use	7.5	7.5	5.5	4.0	5.0	7.5	7.0	8.0	7.5
Potential for Private Sector/Producer Linkages	8.0	8.5	7.5	5.0	7.5	7.5	7.5	8.0	7.5
Potential for Leveraging Private Sector and/ or Public Sector Investment	8.0	8.0	7.5	5.0	6.5	8.0	7.0	7.5	6.5
Viability of Integrating Producers/ Farmer Groups into Value Chain	8.0	7.5	7.5	5.5	7.5	8.5	7.5	7.5	7.5
Potential for Participation of a Wider Range of Beneficiaries including Women and Vulnerable Groups	8.0	7.5	7.0	6.0	5.5	8.5	8.5	7.0	6.5
Potential for Highest Use of Productive Resources in Project Areas	7.5	8.0	5.5	5.0	4.5	8.5	8.0	6.0	6.5
Potential for “Bankability” within a Reasonable Timeframe	2.5	2.5	3.0	1.5	3.0	3.0	2.5	4.0	3.0
Overall Importance in Uganda’s Agricultural Economy	8.5	6.0	5.0	4.5	3.5	7.5	7.0	5.5	5.0
Confluence with GOU Development Goals, CAADP and IEHA	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
TOTAL SCORE	**107.5**	**104.5**	**90.0**	**75.0**	**74.5**	**109.0**	**103.0**	**94.0**	**92.0**

PERCENTAGE SCORE	**76.8**	**74.6**	**64.3**	**53.6**	**53.2**	**77.9**	**73.6**	**67.1**	**65.7**
RANK POSITION	**3**	**5**	**12**	**14**	**15**	**2**	**6**	**8**	**11**

CRETERIA	**PULSES**			**HORTICULTURE**	**COFFEE**	**COTTON**	**AQUACULTURE (FISHERIES)**	**LIVESTOCK**
	Common Beans	**Groundnuts**	**Soybeans**					
Market Potential	8.5	6.5	7.5	7.5	9.0	8.0	7.0	9.0
Impact on Food Security	9.0	7.0	4.0	5.0	2.5	1.5	7.0	6.5
Potential for Impact on Incomes	8.0	7.5	7.0	7.0	9.0	7.5	7.0	8.0
Location-specific Advantage	8.0	8.0	8.0	7.5	9.0	8.5	7.5	7.5
Potential for Increasing Value and Volume of Marketed Product	8.0	7.0	7.5	6.0	8.0	7.0	6.5	8.5
Potential for Value Addition, Premium Price Capture and Industrial Use	5.0	5.0	6.5	6.0	8.0	7.0	6.0	7.5
Potential for Private Sector/Producer Linkages	8.0	7.5	7.5	5.0	8.0	7.5	6.0	7.0
Potential for Leveraging Private Sector and/ or Public Sector Investment	6.5	6.0	6.0	5.0	6.0	5.5	6.5	7.0
Viability of Integrating	9.0	8.0	8.0	8.0	9.0	7.0	6.5	8.5

Producers/ Farmer Groups into Value Chain								
Potential for Participation of a Wider Range of Beneficiaries including Women and Vulnerable Groups	8.5	8.0	7.5	7.0	8.0	7.0	6.0	7.0
Potential for Highest Use of Productive Resources in Project Areas	7.0	7.0	7.0	6.5	8.5	5.0	6.5	7.0
Potential for "Bankability" within a Reasonable Timeframe	2.5	2.0	2.0	2.5	5.5	4.0	3.0	7.0
Overall Importance in Uganda's Agricultural Economy	8.0	5.0	5.0	5.5	9.5	8.5	7.0	8.5
Confluence with GOU Development Goals, CAADP and IEHA	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
TOTAL SCORE	**106.0**	**94.5**	**93.5**	**88.5**	**110.0**	**94.0**	**92.5**	**109.0**
PERCENTAGE SCORE	**75.7**	**67.5**	**66.8**	**63.2**	**78.6**	**67.1**	**66.1**	**77.9**
RANK POSITION	**4**	**7**	**9**	**13**	**1**	**8**	**10**	**2**

NOTE:

1. There was variation among commodities in the rating
2. Cereals: Maize was rated highly followed by upland rice, sorghum, millet and barley in that order for the reasons stated by the stakeholders
3. Among the roots and tubers, cassava took the lead followed by sweet potato
4. Oils crops: Sunflower was higher rated than sesame
5. Pulses: Common beans scored high followed by groundnuts and lastly soybeans
6. Coffee, livestock, cotton, aquaculture and horticulture followed in that order of rating.
7. Overall rating: Coffee (110.0), Cassava (109.0), Livestock (109.0), maize (107.5), Beans (106.0), Upland rice (104.5), Sweet Potato (103.0), Groundnuts (94.5), Cotton (94.0), Sunflower (94.0), Soybeans (93.5), Aquaculture (92.5), Sesame (92), Sorghum (90.0), Horticulture (88.5), Millet (75.0) and barley (74.5).