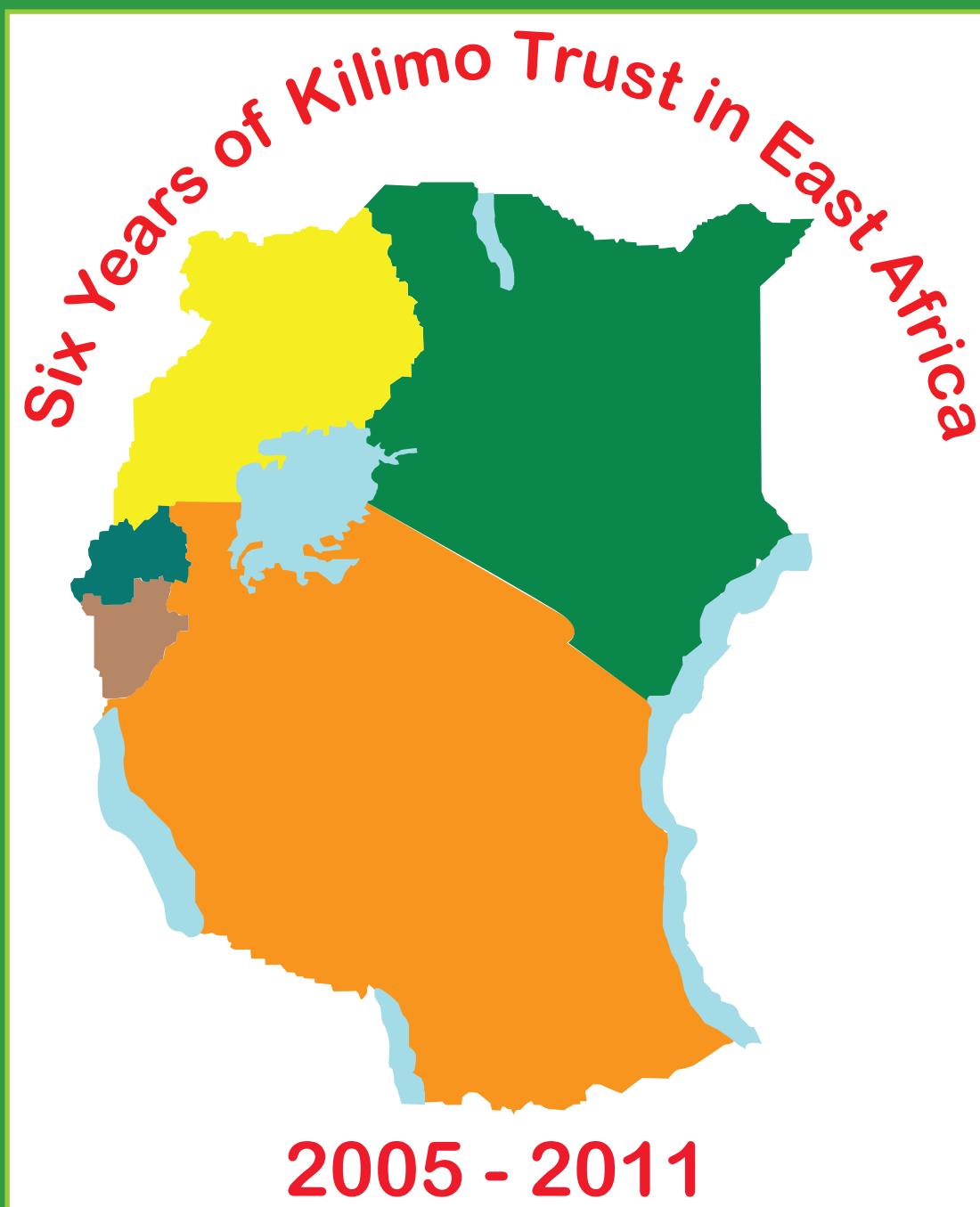


Making Markets Work to Reduce Poverty



**Kilimo
Trust**

regional solutions to local problems

Making Markets Work to Reduce Poverty

Six Years of Kilimo Trust
in East Africa
2005 - 2011

EXECUTIVE SUMMARY

For six years, from its formation in 2005 to June 2011, Kilimo Trust has worked to enable smallholders (producers and other agro-entrepreneurs), who are the backbone of most agricultural value chains in East Africa, to increase productivity, establish viable investible entities able to do business with other investors in agriculture including commercial banks and large agribusinesses, improve post-harvest handling, value addition and marketing; and in doing so improve their livelihoods.

To achieve this, Kilimo Trust awarded grants to public and private organizations. This was to enable them to help groups of smallholders to engage with the private sector, improve their profitability and scale-up the most promising innovations and best practices. We forged partnerships with national and regional organizations that share our vision and complement our set of skills and experience. Regionally the Trust has engaged the EAC Secretariat, the EAC Legislative Assembly and the Presidential Summit to support strategic planning to improve regional approaches to food security, agricultural trade and international trade negotiations.

More than 50 projects were initiated, some directly and others through organisations such as FARM-Africa's Maendeleo Agricultural Technology Fund (MATF). In this publication we highlight our successes and critically review the lessons we have learned during the implementation of the projects we supported.

Building institutions for private-private partnerships

Building private-private partnerships is based broadly on the idea of helping smallholder farmers to become 'business ready' by forming producer and marketing groups and linking them to commercial markets. We have helped build many partnerships across East Africa, identified viable commercial market opportunities, improved on-farm productivity and developed supply chains that connect farmers to markets. Some supply chains focused on basic staples such as maize and soya beans while others on a wide range of cash crops such as barley for the malting industry, African indigenous vegetables, organic vegetables,

onions, cassava, mushrooms, garlic, cashew, honey, poultry, fish, silk and essential oils.

In Kenya and Uganda, the INSPIRE consortium (Integrated Soil Productivity Initiative in Research and Education) has helped over 1,500 smallholders growing maize and soya bean to develop production technologies, organise producer groups and link them to markets. Household seasonal incomes rose from US\$120/ha to as much as US\$360/ha and six agro-input dealerships were established. Some 15,000 small holders were expected to join in 2012. Challenges remain in postharvest handling and storage, particularly as production increases.

In Tanzania, about 700 smallholders in six Districts have formed 10 legally registered producer groups with contracts to grow high quality malting barley for Tanzania Breweries Ltd – a crop not normally grown in Tanzania. In 2011 results were disappointing with production well below expectation because of poor financial services and inputs supply. However, the concept of producer groups is still considered to be a sound one and there are plans to bring in another 1,000 smallholders in the next two years. The brewery currently imports 150,000MT so there is clearly room for import substitution.

In Kenya, there is a growing market among urban consumers for African Indigenous Vegetables – a much undervalued source of nutrition. Smallholders now grow these crops commercially and have formed partnerships with formal markets in Nairobi, Arusha, Kisumu and Busia. Farm incomes increased by over US\$400/ha/season as farmers increased their planting; improved farm inputs and community based technical support and learned to add value through branding, packaging and marketing. Similarly, 1,400 people living in absolute poverty (particularly women and children) in HIV and AIDS affected areas along the Kenyan coast have improved production for both home consumption and the market sale. The 'Commercial Village Approach' was used to cluster farmers. Sales in the past two years exceeded US\$45,000.

The remote West Nile region of Uganda has limited choices for exportable commodities but honey and bee products offered a novel way of increasing smallholder incomes.

Uganda produces only 5,000MT of honey annually but local market demand is about 50,000MT and there is potential for export. Bee Natural Uganda (a registered honey processing company) and others have supported producers to improve the honey value chain. Although honey production in the region has increased by 20% and the plan was sound, the project has run into many start-up problems which are hindering progress at present.

Cashew is the main cash crop in south-eastern Tanzania and smallholders are again beginning to profit as they cut out middlemen and overcome monopolies which impede trade. Growers in Masasi District have formed producer groups, improved crop quality and production, developed their value chain and are working towards Fairtrade Labelling Organisation standards though there are concerns about supplying European markets in the current economic downturn. In 2009 the farmer-owned company commissioned a cashew shelling factory which processes 200MT a year and has prospects to employ up to 190 people .

Regina Hamisi is a farmer, has two children and is also an extension officer and secretary of the Mpindimbi Group. She grows organic cashew at US\$ 0.76 per kilogram. She has doubled her yield from 1.5 bags to 4 bags on the same land and is now able to pay children's school fees at a private school in Mtwara.

Onion growers in Nyeri, Kenya and in Mang'ola, Tanzania have formed nine 'commercial villages' comprising 39 farmer groups (each with 25 farmer members), who share ideas about production, value addition, produce marketing and are able to access professional advice. Farm income has risen 10-fold to US\$11,000/season and most farmers have changed part of the farm system from subsistence to commercial onion production .

Essential oils, produced from citronella and lemon grass, are now a key part of farm incomes in Pallisa, an area of high poverty and degraded lands in eastern Uganda. Some 1,000 farmers have set up production, processing and marketing facilities to commercialise their crops. They planted 400ha of grass and produced 12MT of citronella oil each month worth US\$150,000. There are still challenges to face but there are also opportunities for new local commercial businesses such as transport and value adding enterprises such as bottling, packaging, and candle making .

Women in Mkuranga District, Tanzania, with support from various NGOs have transformed their lives by growing and marketing organic vegetables. Individual income from vegetable sales increased from US\$3 to US\$21 per month. The high market demand and good prices for organic produce encouraged the women farmers to increase their cropped area and yields have risen from 1,210kg/ha/year to 11,400 kg/ha/year .

In rural Uganda poultry rearing has always been a source of income and nutrition for the family. The demand for poultry products is growing among Uganda's urban population due to dietary changes from starch-based foods to meat and dairy produce. A local NGO working with local smallholder institutions has improved chicken production using programmed hatching and exotic cockerel exchange. Some 2,600 families benefitted. The return on each US\$1 invested was US\$16.

Commercial Fish farming is not widely practised although it is an important source of protein, vitamins, minerals and fats. A faith based NGO introduced fish farming, including marketing and value addition, to 120 farmers in central Uganda. Although uptake was slow the farmers established a market in Nairobi and Kampala for seasoned and smoked fish but lacked funds for improvements and expansion.

"I had no idea what agrochemicals to use in my farm. Even if I was sold chalk I would have not known. But after Farm Concern trained us, we now know the best agrochemicals to use" A fish farmer in Nakaseke.

Cassava is an important source of carbohydrates for both people and animals and demand for it is growing. In Tanzania, 280 farmers were introduced to two high yielding and disease resistant cassava varieties together with processing equipment for cassava chips that reduced labour and drying time, enabling them to produce high quality marketable products. Production increased by 50%, farm incomes by 30% and marketing channels improved in three coastal Districts .

Uganda's annual demand for silk is about 120,000 tons and fetches prices of US\$20-30/kg. Eighty farmers were trained in silk production who in turn trained 478 farmers, many of them women. A micro-credit scheme helped farmers to acquire low-cost silkworm rearing houses. This indirectly benefitted a further 2,230 households .

In Uganda garlic production has provided smallholders with a welcome cash crop with quick returns. Two crops a year are possible, unlike crops such as sweet potatoes and cassava which have a two-year growth cycle. Annual farm incomes have increased six-fold to US\$2,470/ha.

Mushrooms are in demand among the main supermarkets and tourist hotels in Tanzania. For smallholders in Hai District, mushrooms offered reliable income and also an affordable food for protein deficient families. The crop has a short growing cycle of 6-12 weeks and can be cultivated all year round. Mushroom production has increased in the District from 174kg/ha to over 16,000kg/ha with annual farm earnings worth over US\$42,000.

Enhancing market support infrastructure

If smallholders are to substantially improve their livelihoods then they must have access to reliable wholesale markets for their produce. While farmers in most Asian countries already do this, wholesale markets in Africa are lagging behind as those that have been developed generally have inadequate facilities and huge problems of congestion, waste and pollution. In view of this we have funded initiatives to look at the potential for wholesale markets in Nairobi and Kigali.

The idea of wholesale markets for fresh produce in Nairobi is not new. Plans date back to 1972, but for a variety of reasons the market for both wholesale and retail functions was never fully developed. A new study was undertaken with new ideas which involved key public sector stakeholders who offered their support for a modern, private sector managed, wholesale fresh produce market. A public-private sector partnership is planned and a 40ha site close to Nairobi and funding discussions are in hand with the World Bank, African Development Bank and the African Enterprise Challenge Fund.

In Rwanda the government has successfully increased fruit and vegetables production but this has not increased farm incomes as only a fraction of this is sold, usually at low prices due to a lack of organised market facilities and postharvest infrastructure for handling perishable crops. The Rwanda Horticulture Development Authority is assessing the feasibility of a well-organized wholesale

market in Kigali. A public-private partnership is envisaged to implement this. In other countries, markets attract civic funding and produce many social and economic benefits like public investment in roads and water supply systems.

Building and Financing the 'Missing' Medium Scale

Across East Africa, commercial banks are cash-rich but rarely give funds to support agriculture. Although the sector generates 50-70% of national incomes and is the region's largest employer, it receives less than 3% of total commercial lending. Even then, agricultural investment focuses on plantations, horticulture and export crops. Smallholder farmers are largely neglected even though they are the principal contributors to food security in the regional economy. They are considered too risky for lending. Kilimo Trust has worked to address these disparities.

In Tanzania and Uganda, Kilimo Trust in partnership with AGRA has provided US\$5 million in First Loss Loan Guarantees in order to institutionalize commercial bank credit products for smallholder farmers and SMEs participating in key agricultural value chains for specific commodities such as maize, rice, sunflower, beans, sorghum and barley. Loans were made available to support primary production, post-harvest handling, storage, processing, transportation and trade in agricultural inputs and produce. This is the largest single effort to lend at scale to agriculture in the region. An example is loans totalling US\$2 million to support ten registered producer groups growing barley for Tanzania Breweries Ltd. This has greatly benefited both the farmers and the brewery. In 2011 Stanbic Bank Uganda committed to disburse loans worth US\$10 million to smallholders and SMEs.

In Uganda the cooperative movement is supporting private Area Cooperative Enterprises which engage in organized marketing for better prices and services. Some 2,000 farmers have invested in grain storage facilities and a warehouse receipt system and now command 30% above average market prices. One cooperative has secured contracts to supply 4,000MT/yr of sorghum to Nile Breweries, 580MT/yr of maize to the World Food Programme and 200MT/yr of sorghum seed to a private seed company.

Innovative micro-credit facilities are being introduced across East Africa to enable low income households to benefit from the introduction of clonal forest technology for small and medium size entrepreneurs to establish tree nurseries. The credit facilities provide the poor with opportunities to take advantage of this important growing industry.

Commercialising Technical Innovations

Kilimo Trust has been commercialising technical innovations in key areas of food and energy security. Investments in Striga control have the potential to substantially improve cereal grain production while clonal forest technology is increasing tree production for fuel wood and timber.

Striga is the most pervasive and damaging parasitic weed threatening cereal production in East Africa. More than 2 million hectares are infected and each year, millions of tons of cereals are lost with an estimated value of US\$437 million – more than US\$1.0 million a day. Over the past 10 years, practices for Striga control, such as ‘push-pull’ and Striga resistant varieties, have been perfected but the problem continues to grow. This has shown that Striga cannot be eliminated by a single method alone. A combination of different technologies and practices, strong collective action and strategic public and private sector investment is required to eliminate it. Indeed a regional strategy is needed because Striga infestations do not respect national boundaries. A number of actions are now underway across Kenya, Uganda and Tanzania. Kilimo Trust is spearheading a major regional Striga control programme comprising two 6-year phases with the aim of substantially increasing maize, sorghum, rice and millet production on 60% of the currently infested cropped land. The programme requires private sector investment of US\$380 million with an estimated US\$40 million from the public sector.

The introduction of clonal forest technology across East Africa is now beginning to transform wood production as the region depends on it for over 90% of its energy needs and for construction materials. Working in partnership with Mondi Forests Ltd of South Africa, Eucalyptus hybrids well suited to smallholder farming were introduced in trials across Kenya, Tanzania and Uganda. The result is that over 80 commercial nurseries have been established and

some 21 million trees planted with an estimated value of US\$370 million – a 100-fold increase on the initial investment. This programme is not without its critics but it is producing substantial economic benefits and contributing to the current global effort of Reducing Emissions from Forest Degradation and Deforestation (REDD).

In Uganda, increasing fertilizer use is crucial to sustainably increasing the country’s agricultural productivity of staple food crops. A well-established rural farm inputs retail network has made fertilizers available to over 30,000 smallholders in 6 Districts. They brought in fertilizer manufacturers, suppliers and distributors provided credit facilities, gave technical information and set up infrastructure and markets to cope with the increased production. In many cases crop yields more than doubled and produced an additional gross income of US\$450/ha/season.

Smallholder farmers in Western Kenya are finding that Conservation Agriculture is an affordable and appropriate technology that holds the key not only to sustained food security but also improvements to soils and ecosystems services. About 2,700 smallholders have adopted the new practices and maize yields have doubled from 1.5 to 3.0 MT/ha and from 1.1 to 1.8 MT/ha for soybean. Net household incomes rose from US\$53 to US\$146.

Banana Bacterial Wilt (BBW) has been blighting the banana crop in Uganda. The technologies for control are well known but not widely adopted. Over 90% of bananas is now protected following a programme of information dissemination and empowerment of national and local governments and communities to apply the tried and tested technologies. In 2007 national banana production increased from an estimated US\$290 million (without BBW control) to US\$560 with substantial control. A similar programme is ready to roll out in Tanzania, Kenya, Rwanda, Burundi and Democratic Republic of Congo where BBW is a problem.

Over 3,000 smallholders in Namutumba, Ugandans have changed their cropping system from low-land flooded rice to the African upland rice variety NERICA III. This has not only lifted the quality of life for people labouring with uncertain rains, declining wetlands and Bilharzia but has also relieved environmental pressures on wetlands. Over a three year period upland rice has grown in popularity, nearly 1,800 tons of rice was harvested

- worth US\$1.3 million, sales of farm inputs have increased as well as off-farm business such as rice milling .

Upland rice was also introduced to farmers in Luweero, Uganda. Production increased from 1,600/ha to 2,800kg/ha for milled rice and the local ecosystem improved. Market information and collective marketing enabled farmers to negotiate for better prices.

A communications NGO has demonstrated how participatory learning through farmer-to-farmer videos can stimulate uptake of new and improved practices and improve yields for rice. This innovative approach to agricultural extension in local languages is reaping dividends across East Africa .

In western Kenya, some 300 smallholders are learning to use drip irrigation kits to grow high value commercial crops such as vegetables and bananas. An added benefit of these changes from traditional subsistence farming is the availability of clean water from irrigation tanks for domestic use which reduces families' workload to search for clean water sources.

Traditional forms of grain storage offer little protection and weevils are the main cause of post-harvest grain losses in eastern Kenya. The introduction of metal storage silos means that farmers are now able to safeguard their grains and guarantee food security for their homesteads. These silos can be used for over 50 years, with minimal maintenance costs .

Mangos are the main fruits grown along the Kenyan coast. They are usually sold fresh which creates a surplus during the harvesting seasons and decreases market prices. Smallholders are trained in production and marketing technologies and supported to add value by taking advantage of drying mango chips and pickling methods to extend product shelf-life. This has improved their income and created employment.

Newcastle disease can cause devastating losses among village chicken in Tanzania. New thermo-stable vaccines, which are more robust and can be transported without refrigeration are proving invaluable for controlling this disease. Almost 6,000 smallholders in Mwanza, Tanzania now use this vaccine and chicken mortality has decreased by 80%. Farm incomes have increased as well as benefitting household nutrition.

Salinity can result in irrigated land being abandoned as unproductive in arid regions. By adopting careful management systems, this land can be reclaimed. On smallholder irrigation schemes, rice yields on reclaimed land increased from 240kg/ha to 1200kg/ha and maize yields increased from 120kg/ha to 520kg/ha. Average income of rice/maize farmers growing on reclaimed land more than tripled from US\$125 to US\$417/year .

Urea Molasses Multi-nutrient Blocks are convenient and inexpensive 'lick' blocks containing molasses, vitamins and minerals to provide animals with essential nutrients which may be deficient in their diet. The introduction of this simple technology has substantially increased cow milk yields for some 450 farmers in Uguja and Pemba islands in Zanzibar from 1 litre/day to 5 litres/day and farm incomes from US\$0.40 to 2.10/cow/day.

Introducing smallholders in Tanzania to Draught Animal Power technologies for cultivations has significantly reduced farm labour by 90%, increased household cropped area from 3 to 3.4ha and, in combination with other farm inputs, increased maize yields from 800kg/ha to 2,900kg/ha. Additionally farmers used the time saved to pursue off-farm income generating activities such as carpentry and blacksmithing.

Leadership on Supportive Policies and Strategies at Regional Level

All governments have a responsibility to develop robust and effective evidence-based policies for economic growth and food security. Good data on which to base policy is seldom available. Although all East African Community (EAC) Partner States have policies on agricultural development, food security and nutrition, they have a number of weaknesses. Kilimo Trust commissioned a number of strategic studies and organised high level regional meetings and discussions to strengthen a well-designed food security policy and strategy for the region.

In 2008, a study was undertaken to provide critical evidence for negotiating the Framework Economic Partnership Agreement between EAC and the EU covering trade in goods and market access, cooperation and fisheries .

In 2009, a study co-financed with FAO was undertaken to enhance EAC regional trade-based

food security and to evaluate gaps in the policies and strategies for infrastructure that support regional value chains for staple food products. The Trust organized high-level roundtable discussions which were attended by delegates from over 10 countries to discuss and make recommendations on strategies and good practices for maximising benefits and investments in market-oriented agricultural infrastructure, with particular priority for 'last-mile' infrastructure .

In 2010, the EAC's East African Legislative Assembly (EALA) commissioned a high level round-table meeting for food security experts and policy-makers to discuss the feasibility for a Common Strategy for Food Security in the EAC.

Agriculture sub-sector studies commissioned by Kilimo Trust

1. A study to scope the livestock product value chains in East Africa which showed that, while this is an expanding and important market for smallholders, there were barriers to increasing international trade and so farmers and agri-businesses should concentrate on East Africa's national and regional markets.
2. A development report identified opportunities for agro-industry to contribute to food security in the East African Community region. Only 28% of agricultural produce is processed and much of this is primary processing. A roundtable dialogue of Directors endorsed the 'East Africa Agro-industries and Agro-enterprises Development Program' (E3ADP) to accelerate agri-industry development, getting markets and trade right, making existing and planned infrastructure effective, getting the right policy framework and attracting finance and investment.
3. Another study examined the dairy value chain in Central Kenya; the challenges faced by farmers, traders, processor and government agencies and the investment needed to promote growth and competitiveness in this lucrative rural industry. Recommendations included: forming and strengthening producer groups to improve farmer effectiveness as centres for milk marketing and providing comprehensive support services in partnership with service providers.

GCF has been with KT all the Way

As an East Africa-based and home-grown Trust focusing on agricultural development, Kilimo Trust was established in 2005 with generous support from the Gatsby Charitable Foundation (GCF). Furthermore, GCF has continued to be the main funder of the Trust to date. The Trustees and all stakeholders of Kilimo Trust greatly appreciate this long term financial and strategic support.

ACRONYMS

3ADI	African Agribusiness and Agro-industries Development Initiative
AATF	African Agricultural Technology Foundation
ACE's	Area Cooperative Enterprises
ADI	Agro-industries Development Initiative
AECF	African Enterprise Challenge Fund
AfDB	African Development Bank
AGRA	Alliance for a Green Revolution in Africa
AIV's	African Indigenous Vegetables
AMCOS	Agricultural Marketing Cooperative Societies
ARI	Agricultural Research Institute
ASDP	Agriculture Sector Development Programme
AT - Uganda	Appropriet Technology - Uganda
BBW	Banana Bacterial Wilt
BDS	Business Development Services
BEP	Break-Even Point
BNU	Bee Natural Uganda
BSU's	Business Support Units
CA	Conservation Agriculture
CAADP	Comprehensive African Agriculture Development Programme
CBO	Community Based Organization
CCA	Corporate Council on Africa of the USA
CIDI	Community Integrated Development Initiative
COTE's	Community-based Technical Experts
CRS	Catholic Relief Service
CV	Commercial Villages
CYMMIT	International Maize and Wheat Center
DADPS	District Agricultural Development Plans
DALDO	District Agricultural and Livestock Development Office
DAP	Draft Animal Power
DATIC	District Agricultural Training and Information Center
DSIP	Development Strategy and Investment Plan
DUCON	Dutch Connexion Limited
E3ADP	East Africa Agro-industries and Agro-enterprises Development Program

EAC	East African Community
EALA	East African Legislative Assembly
EPA	Economic Partnership Agreement
ESA	Eastern and Southern Africa
EU	European Union
FAO	Food and Agricultural Organization
FARM-Africa	Food and Agricultural Research Management – Africa
FCI	Farm Concern International
FEPA	Framework Economic Partnership Agreement
FFS	Farmer Field Schools
FFT	Field Farmer Trainer
FICA	Farm Inputs Care Centre Limited
FLO	Fair-trade Labeling Organization
GAWU	Gari Anding’o Opanga, West Kadiang’a, Upper Nyakach Village Bank
GCF	Gatsby Charitable Foundation
GDP	Gross Domestic Product
GNI	Gross National Income
Ha	Hectare(s)
HCA	Horticultural Council of Africa
HCA	Hydrocyanic Acid
HCDA	Horticultural Crops Development Authority
HH	Household
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
ICIPE	International Center for Insect Physiology and Ecology
ICRAF	International Centre for Research in Agro-forestry
IEPA	Interim Economic Partnership Agreements
INSPIRE	Integrated Soil Productivity Initiative in Research and Education
IPFFL	Introduction and Promotion of Fish Farming
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KARI	Kenya Agricultural Research Institute
KBS	Kenya Bureau of Standards
KCB	Kenya Commercial Bank
KDA	K-rep Development Agency
KDFA	Kabalore District Farmers Association
KEFRI	Kenya Forestry Research Institute

KEPHI	Kenya Planters Health Inspector
KFS	Kenya Forestry Service
KGT	Kenya Gatsby Trust
KIHATA	Kilimo Hai Tanzania
KIMAP	Kilifi and Malindi Agricultural Products
KIRDI	Kenya Industrial Research Development Institute
Ksh	Kenya Shillings
KT	Kilimo Trust
LDC's	Less Developed Countries
Lu-Rice	Luweero Rice
LZARDI	Lake Zone Agricultural Research Development Institute - Tanzania
M&E	Monitoring and Evaluation
MALE	Ministry of Agriculture Livestock and Environment
MARI	Mikocheni Agricultural Research Institute
MATF	Maendeleo Agricultural Technology Fund
MFI	Micro-Finance Institution
MHQFPL	Masasi High Quality Farmers Products Limited
MIICO	Mbozi Ileje and Isangati Consortium
MKIWAKI	Mshikamano Women Group
MOA	Ministry of Agriculture
MoU	Memorandum of understanding
MSU	Marketing Support Units
MT	Metric ton
MT/ha	Metric Tons per Hectare
MVIWATA	Mtandao wa Vikundi vya Wakurima Tanzania.
NAADS	National Agricultural Advisory Services
NaCRRI	National Crop Research Institute
NARO	National Agricultural Research Organization
NCD	Newcastle Disease
NERICA	New Rice for Africa
NGO	Non Governmental Organization
OFSP	Orange Fleshed Sweet Potato
PADEP	Participatory Agricultural Development and Empowerment Project.
PAFA	Pallisa District Farmers Association
PM&E	Project Monitoring and Evaluation

PPF	Public – Private Partnership
RACA	Rakai Counselors’ Association
RCA	Rwanda Cooperative Agency
RECA	Relief and Environmental Care – Africa
REDD	Reduced Emissions from forest Degradation and Deforestation
RUDI	Rural Urban Development Initiatives
SACCO	Saving and Credit Cooperative
SANA	Sustainable Aid in Africa International
SIDO	Small Industries Development Organization
SME’s	Small and Medium Enterprises
SNV	Netherlands Development Organization
SRI	Sugar research Institute
SUA	Sokoine University of Agriculture
TAMC	Technical Advisory and Management Centre
Tan Cert	Tanzania Certification Body
TAV	Traditional African Vegetable
TAWLAE	Tanzania Women in Leadership and Agricultural Empowerment
TBL	Tanzania Breweries Limited
TBP	Tree Biotechnology Programme
TBPT	Tree Biotechnology Programme Trust
TC	Tissue culture
TFA	Tanganyika Farmers Association
ToTs	Trainers of Trainers
Tsh	Tanzania Shillings
TWG	Technical Working Group
UCA	Uganda Cooperative Alliance
UEPB	Uganda Export Promotion Board
UMMB	Urea Molasses Multi-nutrients Block
USAID	United States Agency for International Development
VEDCO	Volunteer Efforts for Development Concerns
WRS	Warehouse Receipt System

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INTRODUCTION: Making Markets Work To Reduce Poverty

Kilimo Trust is pleased to present this comprehensive report of the projects, results and impacts it has supported in the EAC Region during our first six years of operation (July 2005 to June 2011). As we celebrated our 6th anniversary; we have initiated our transformation from a grant-maker and manager, to a more hands-on implementation organization that delivers “*regional solutions to local problems*” in the EAC Region.

Based on the experience we have gained in the past six years and our understanding of the opportunities and obstacles of making markets work for the poor (M4P), we are looking forward to the next decade in which we will be one of the leading regional organizations dedicated to developing and enhancing regional agricultural value chains making markets work for poverty reduction in the EAC Region. We shall be a leading champion of using the East African Common Market as a platform for attaining food security in the region and creating wealth and reducing poverty through agriculture.

This report summarises our six years of experience in agriculture for development through 50 projects and three programmes supported and implemented in the EAC Region. The report describes the bold initiatives we made, the results and impacts we produced and the lessons we learned from the challenges we faced.

Kilimo Trust was founded in 2005 to facilitate wealth creation and reduction of poverty through agriculture and agri-business development in Sub-Saharan Africa with a special focus on the member countries of the East African Community (EAC).

We started our business by taking over the management of what was then the GCF’s African Agricultural Programme. This was mainly supporting R&D programmes in the region. The new programmes and projects we supported thereafter focused more on the development of market access and linkages for the producers and other actors in agricultural sectors. These initiatives were designed to build win-win partnerships between producers and their support partners (*the NGOs and public programmes that support agricultural development*), and the private sector (*inputs suppliers, marketing companies, agro-industries, and financial institutions*).

The programmes and projects we supported covered the following themes.

Institutions for Private – Private

Partnership between the investable agri-SMEs of producers, private sector agribusiness and financial sector. In this, we facilitated the building of tri-partite partnerships involving organized smallholders, large scale agri-businesses and processors and commercial banks.

Market Support Infrastructure

Building and Financing the “Missing” Medium Scale; there is a major contradiction that the contribution of agriculture to GDP/GNI in many Sub-Saharan African countries is often reported to be less than 30% while it is said that between 50 to 90% of the working population is in the agricultural sector. If these statistics are correct, then we need to search for answers to many questions. Is it possible that the statistics are wrongly assuming that all people in the rural areas are engaged in farming? If some people counted as farming in the rural areas are not farming, what are they doing? What proportion of the rural population do they constitute? Are the agricultural focused rural development programmes helping these people in their livelihoods or are they only helping to perpetuate poverty? Are all those who are engaged in farming choosing to do farming as a business or do they farm because of lack of alternatives? Without scientific answers to these questions, efforts and money will be wasted doing the wrong things in the rural areas. Therefore, our projects under this thrust worked to enable small and medium scale producers to build scales that attract buyers and investment by; enabling them to meet the quantities, quality standards and timely delivery demanded by their partners in a value chain. The outcome of this investment has been the establishment of viable small and medium size producers’ enterprises which are building partnerships with other actors in agricultural value chains.

Commercialising Technical Innovations

Technical Innovations was the major focus of the programmes Kilimo Trust inherited from GCF. The focus was then to commercialize innovations in technologies and services coming out of these programmes. For example, the regional programme devoted to mainstreaming clonal technology for tree growers in East Africa achieved substantial commercialisation of vital tree planting technologies deployed through central nurseries and smallholder nursery enterprises. As a result, new trees with an estimated value of \$370 million have been planted and related businesses have been established generating about 3,000 jobs in the region. The regional program to control Striga led to the perfection of a Biological Approach to Striga Control, called “Push-Pull”. In addition to building “Striga Smartness” among all agricultural development programs in areas where Striga is a problem across East Africa to facilitate the commercial adoption of push-pull and other methods for Striga control.

Supportive Policies

Kilimo Trust recognizes that gaps exist in ensuring adequate policy support as well as the necessary strategic investment by the public sector. To help fill these gaps the Trust identified and financed a number of short-term “thought leadership” studies to help generate the evidence and knowledge necessary to guide policy dialogue and formulation and strategic planning at international, regional, and local levels. These studies focused on two main value chains. First is the knowledge value chain which looks at moving agricultural knowledge from research into practice. Second are the agricultural value chains which effectively link small and medium size producers to markets and consumers.

Report Structure

The report includes a summary description of results and outcomes from each of the projects we have supported and managed since July 2005. The projects are presented under each of the four themes described above though we recognize that many projects contributed to several themes.

A: Building Institutions for Private-Private- Partnerships

Small Scale Farmers enter Malting Barley Supply Chain

Farmers in Tanzania are showing that it can be done

Although there is a growing demand for barley to supply the Tanzanian brewing industry, most of the current annual requirement of 150,000 MT is imported from Europe. This begs the question – why not grow barley locally so that Tanzanian Breweries have a locally assured supply of grain and enable many thousands of impoverished smallholder farmers' to benefit from supplying it?

There are two main reasons why this is not happening. Firstly, although barley is a crop well suited to the soils and climate of Tanzania, farmers have little experience of growing it and so it is not widely cultivated. In the southern highlands smallholders rely mainly on maize and rice. However, yields are generally poor because of unreliable rainfall. Weak supply chains have meant that inputs are not always available and prices for crops are low because they are not well marketed. Secondly, and equally important, is that most smallholders have little experience on the demands of commercial farming and the contractual arrangements which are essential to ensure timely and reliable delivery of high quality grain to the brewers.

To meet these challenges Kilimo Trust funded a US\$70,000 project through MIICO, a local organisation, to help smallholders not only grow barley of a quality acceptable for brewing but also to build their capacity so they are 'business ready' and able to engage contractually with commercial brewers. The project currently covers six Districts – Mbozi, Kilolo, Mufindi, Njombe, Makete and Iringa – in the regions of Mbeya and Iringa – and initially involved about 700 smallholder farmers.

In order for them to engage with the large commercial brewers, smallholders were grouped into 10 legally registered producer organizations – Agricultural Marketing Cooperative Societies (AMCOSs).

This was a major step forward for most smallholders who had little previous experience of working together in legally binding procedures and engaging in commercial production. The District Councils, through their extension staff are supporting them through capacity building of the farmers'

organizations and follow up. This wider support will help to ensure the sustainability of the supply chain being established when the initial funding ends.

Group formation has enabled the smallholders to collectively agree and sign contracts to supply grain to Tanzania Breweries Ltd. The groups' capacity to contract has enabled them to sign supply contracts to secure farm inputs. This included contracts with banks to provide credit input suppliers to provide fertilizers and agrichemicals and service providers to provide equipment hire services for planting, harvesting and spraying.

In 2011, the area cultivated by all groups had only reached 856ha and total production was only 61MT. This was well below expectations and there were substantial losses for the farmers. Service providers did not deliver the machines and inputs on time especially for the harvesting and extension support. The seed supplied to support farmers growing barley for the first time, was of poor quality leading to low germination rate. Financing arrangements were also poor. Farmers needed training in postharvest handling and storage and more timely grain collection which would all help to reduce crop losses after harvest. However, the role of the AMCOS as a means of improving the collective marketing of the produce has proved to be worth.

Despite these initial major challenges, the 10 farmer groups are eventually expected to grow about 1,500 ha of barley with a projected yield of some 4,700 MT/season valued at US\$ 1.8 million. In the next two years, another 1,000 farmers are expected to join the project and bring in a further 1,600 ha of barley. These current levels of local production are modest in comparison to Tanzania Breweries Ltd demand of

150,000MT of barley annually. This is a significant opportunity for increasing barley production and for bringing more smallholders into the commercial production process.

Major outcomes of this initiative will include

- A new crop with opportunities for income generation for smallholder farmers in the Southern Highlands of Tanzania will be established. Already, barley is being considered for inclusion as one of the strategic crops to be supported by the Tanzanian Government. Such support includes access to subsidised input, access to specialised extension services and attention from Government officials.

- This project will yet be another example of a major policy change to work with smallholder farmers which creates mutual benefits for a multinational private sector company and the community where it operates. This will enhance the regional self-sufficiency for such commodities which were previously being imported, with additional benefits of earning foreign exchange for the national economy.

With more farmers being able to contract and participate in a mutually beneficial supply chain, it is more likely that a vibrant service market for inputs, financial and mechanical services, agro-industry and other supportive agricultural markets will develop to serve rural-based smallholder farmers.

Integration of Small Scale Farmers into Malting Barley Supply Chain –(Mbozi Ileje and Isangati Consortium)-MIICO

Commercializing African indigenous foods

Sub-Saharan Africa is home to hundreds of African Indigenous Vegetables (AIVs), which can supply the vitamins and minerals needed to combat malnutrition. Orange-Fleshed Sweet Potatoes (OFSP) contains more vitamin A than varieties that are commonly available in the market. A project funded by Kilimo Trust and implemented by a consortium of three institutions – the International Potato Center, The World Vegetable Centre (AVRDC) and Farm Concern International has proved that opportunities exist for smallholder farmers to turn these previously under-valued but nutritious crops into commercial cash crops. The purpose of the intervention was to create beneficial “private-private” partnerships between farmers and formal markets in Nairobi, Arusha, Kisumu, Busia and other local markets in the target districts. This opened up a market opportunity with annual sales of AIVs and OFSP worth over US\$200,000. Farm incomes increased by over US\$400 per hectare per season while the land area planted with AIVs and OFSP increased by 20%. Equally important, the producer households increased consumption of the AIVs and OFSP, thereby boosting nutrition security.

Traditional vegetables have always been highly regarded among rural communities as a means of providing good nutritious food for the young and old alike. OFSP for example is an important source of vitamin A which is crucial for healthy growth of young children. However they are not usually thought of as a major source of income for smallholder farmers. Their poor product image was a major barrier to acceptance in the modern commercial market place. Most traditional vegetables were harvested wild rather than cultivated making production modest and dependent on the uncertainties of the rainy seasons. There was a lack of commercially available seed and the value chains to supply inputs and outputs were practically non-existent.

With funding from Kilimo Trust, the Traditional Foods Project is providing opportunities for smallholders to cash in on these crops. The project has supported over 2,600 smallholder farmers (15,882 household members) organized into 99 Marketing Supporting Units (MSU) across Kiambu, Busia and Kabondo in Kenya and Arumeru District in Tanzania through a partnership of three institutions – the International Potato Center, The World Vegetable Centre, Africa Regional Office, Arusha, Tanzania (AVRDC) and Farm Concern International.

Several key developments combined to achieve this successful outcome

- Farmers needed quality and reliable supplies of seed to produce more traditional vegetables. The project achieved this by strengthening the supply system through partnership agreements with private sector suppliers and seed multipliers who were trained and contracted to multiply and supply quality seed. For sustainability of the project, a strong partnership and formal agreement had been established with SIMLAW Seed company, a subsidiary of Kenya Seed
- Farmers also needed better farm input supplies to achieve better yields and so agro-dealers were engaged to make seeds, fertilizers and pesticides available to them at a price 25% lower than the price that farmers used to pay. After the project, the price remained low as some farmers had started multiplying the seed themselves and selling to fellow farmers. Additionally, agro-dealers also provided training to farmers in safe handling and efficient and environmentally sound use of farm inputs. In one season, farmers were able to access inputs worth US\$15,000.

- Farmers benefited from the technical support from 31 Community Based Technical Experts (COTEs) who were trained and commissioned under the project to offer technical services to farmers. Farmers pay a fee for their services thus ensuring the sustainability of this kind of support. The project set up 87 on-farm demonstration plots (at least two demonstration plots per Commercial Village per season), three exchange visits and four field days were conducted in Arusha, Kabondo, Busia and Kiambu.

MWIRERI SELF-HELP GROUP

This group started in 2008 in Kiambu district of Kenya. Each member has a savings passbook and members contribute US\$5.3 every month from the proceeds of vegetables sales to Uchumi supermarket in Nairobi. It is saved in a group saving account at Equity bank.

The group has been able to pool funds and sink shallow wells for irrigation purposes to expand their vegetable production capacity beyond the rainy seasons and harvest and sell traditional vegetables all-year round.

- The ‘commercial village model’ was used to empower impoverished smallholders, whose incomes are low and whose production systems are disorganised, to pool their resources and enhance their ability to invest and diversify their income generation portfolio. Following this strategy farmers were able to invest in the capital market and buy assets such as water tanks, stores, houses, a plot of land, transport and cows. Others have managed to pay school fees. Farmers were supported to set up a contributory group savings scheme to establish financial security for members. Accounts were successfully setup with Equity bank, microfinance institutions and SACCOS (depending on the availability and accessibility). Financial institutions have also assisted farmers in consolidating their savings and acquiring loans for investment.

- Farmers learned to add value to their produce through branding, packaging and marketing. One example was the development of sweet potato flour with Azuri Ltd, a private sector company.

The Kagwe farmer group in Kiambu now sell their AIVs to Uchumi supermarket (one of the biggest supermarket chains in East Africa).

The Traditional Foods project has empowered farmers in the four project areas and provided a source of income for many households and is creating many jobs in the value chain. This project presents an opportunity for development organizations, donors, governments and the private sector to invest in the value chain and provide finance and transport services, input supply, value addition, extension, seed multiplication and where appropriate water harvesting and irrigation.

There are still challenges to face not least of which is the uncertainty of rainfall and water shortages. Confidence in input supply has also fallen a little as the project ended and subsidies were removed and a shortage of packaging material threatens the marketability and branding of the produce.

But evidence shows that the income and health of smallholders has improved and there are recommendations to upscale and replicate it in other parts of the region.

Understanding how to achieve impact-at-scale through nutritional focused marketing of African Indigenous Vegetables (AIVs) and Orange-Fleshed Sweet Potatoes (OFSP) – International Potato Centre

Rural Producer Organisations

The anchor of making markets work to reduce poverty

Kilimo Trust grants have enabled the INSPIRE consortium to help over 1500 smallholders to increase their output of maize and soybean, form producer groups and market their produce to meet the growing demand in Uganda and Kenya. The project raised farmer household seasonal incomes from US\$120 to US\$360 per hectare and expects to scale up to include more than 15,000 smallholders in the coming year. As a result of increased marketing, the portfolio of farmer savings within producer groups has risen substantially. In addition, six rural-based agro-input dealers have developed viable business enterprises through increased sales of fertilizer and improved seeds. Stockists now earn an average of US\$1,000 per season – a 100% increase from previous years.

How do impoverished Ugandan smallholder farmers, producing staple food crops such as maize and soybean, increase production and take advantage of the national and regional commercial markets which exist for these crops? Getting smallholders to work together in producer groups is one solution being successfully developed and tested by the Integrated Soil Productivity Initiative in Research and Education (INSPIRE) – a consortium of financial institutions, processors, bulk traders and public sector research and extension organisations.

Individually, smallholder farmers usually grow food for immediate family and local consumption which limits their income and traps them in a cycle of poverty. They do not produce crops in sufficient quantities to enable them to gain access to more lucrative commercial markets.

Indeed, the transaction costs of collecting and transporting small quantities of grain often at unpredictable times are just too high to be profitable. In East Africa there is the '30-ton truck' rule which says if you have enough produce to fill a 30-ton truck and it can be reliably brought together in one place for collection, then both the farmers and the transporter can profit from it. If smallholders are to improve their livelihoods, the challenge then is to help them to work together rather than individually so they can bulk their produce, link up with transport and share in the benefits. However, there are several steps in achieving this. Farmers need to understand how commercial business works by appreciating the importance of contractual commitments involved in working together. To support this there needs

to be good, reliable infrastructure for growing and producing quality crops, produce collection, bulk storage processing and transporting them to markets.

To achieve this, different public and private organizations have stepped up to support farmers and to organize them into marketing associations to take over the marketing functions previously performed by the cooperatives. The INSPIRE consortium is one such organization. Its members include financial institutions, processors, bulk traders and public sector research and extension institutions such as local governments and NGOs.

INSPIRE, with financial support from Kilimo Trust, began work in 2005 in the Eastern Ugandan districts of Busia, Tororo, Mbale and Budaka. The initial focus was on developing technologies to improve on-farm production and the capacity of farmers to organise and function as producer groups. Farmer Field Schools (FFSs) were used to train farmers and increase crop production. This included setting up study plots, experiments and demonstration sites on soil, water and land management. Technologies were tested and the principles and practices of Conservation Agriculture (CA) were demonstrated and adapted to cotton-cereal cropping systems (using cover crops). CA tools and equipment were used and the benefits and challenges of this approach to farming were analysed. This led to a CA FFS project in Mbale and Pallisa initiated and funded in two phases by the Food and Agricultural Organisation (FAO).

The final phase for INSPIRE was to organise farmers into producer groups and develop the linkages which bring together all the key elements in the supply chain. INSPIRE then looked for ways of scaling up these benefits and bring together bulk quantities that are essential for collective marketing.

There are immense opportunities for producer groups, including the growing demand for soybean and maize, which are grown extensively in Eastern Uganda and Western Kenya. INSPIRE in collaboration with Makerere University, is now supporting over 1,500 smallholders to take up this investment opportunity by promoting and marketing improved soybean varieties. It costs about US\$203-230 to produce a ton of soybean but this can sell for as much as US\$350-400/MT in the Busia Uganda Produce Market. So the project has been able to raise farmer household seasonal incomes from maize and soybean production from US\$120 to as much as US\$360/ha/season.

The project expects to scale this up to include more than 15,000 smallholders in the coming years if appropriate funding support is available.

As a result of increased marketing of both maize and soybean, the portfolio of farmer savings within producer groups has risen substantially. In 2010 two groups in Tororo district reported savings of up to US\$1,609 and US\$2,174/yr.

Six rural-based agro-input dealers have developed viable business enterprises through increased sales of fertilizer and improved seeds and stockists now earn an average of US\$1,000 per season – a 100% increase on previous years. It would be unreasonable to attribute all this to the INSPIRE consortium activities as other promotional work done by NAADS was also taking place at the same time.

One farmer, Mr. James Okumu, Chairperson, Sinani FFS, Busia had this to say:

“As a result of our soybean Producer Group joining Bulumbi Network I got to know about the Mak Soy 1N variety which matures quickly, is good for our area and for low rainfall conditions. The Network has an input shop and I borrowed Agro-Leaf fertilizer to use on my 3 hectares of soybean. I harvested 4MT which was sold collectively to a bulk buyer from the Busia Produce Market at US\$500/MT. I shall use the US\$2,000 I have earned to buy a tractor on a hire purchase scheme from centenary bank ”

Opportunities for private sector service providers such as AgriNet are now emerging to invest in market information provision. Despite the high demand for grain and the benefits realised by farmers, challenges exist in postharvest handling and storage arising from increasing production. Storage is needed to facilitate bulking in readiness for buyers and investment to assist in operating a warehouse receipt system that would enable farmers to access credit and inputs necessary for increased production. With plans to scale up this project to reach up to 15,000 farmers, a full Cooperative Enterprise is feasible for these farmers in the near future that would jointly purchase inputs, market output and add value to produce. But this is likely to need donor support plus the involvement of financial and insurance institutions to provide credit facilities and compensate farmers in case of unexpected losses.

Building Honey Value Chains in Uganda's West Nile Region

Natural resources management for income generation

Reducing poverty, increasing food security and household income has always been a challenge for communities in the remote West Nile region of Uganda, especially after the effects of a long civil war. Over-reliance in the past on cash crops such as tobacco led to significant environmental degradation. Bee-keeping offers a unique income opportunity for smallholders in the region. There is a strong market for honey and other apiculture products. Apiculture is environmentally friendly and bees play a big role in pollinating other crops thereby improving food security. But is the potential realizable?

The remote West Nile region of Uganda has limited choices for exportable commodities but honey and bee products potentially offer a novel way of increasing income and improving the livelihoods of smallholder communities.

Honey and bee products (honey, wax, propolis) have a ready market in Uganda and elsewhere. Estimates suggest that Uganda produces 5,000MT of honey annually whereas the local market potential is more than 10 times this amount. Honey sells on the local market for US\$4 per kilogram and more when it is properly packed and branded. The good price reflects the limited production and the growing demand for honey and bee products which are used not just as food but also in medicine, cosmetics and candle making. The demand for honey and bee products regionally and internationally is also considerable.

In order to exploit this potential Kilimo Trust, Bee Natural Uganda (a private honey processing company), SNV and Centenary bank conceived a unique project to enable bee-keepers to increase production and gain access to both national and international markets. The project involved improvements along the honey value chain – beekeeping, input supply, farmer institution development, collection centres, financial services, regulation and standards, business services and marketing. The lead firm, Bee Natural Uganda, already has access to markets and is certified to supply exports to EU markets.

Bee Natural Uganda owns a 600 MT annual capacity honey processing and packaging plant and capitalises on the honey production in West Nile region of Uganda. The factory has been running below capacity at 60-120MT/yr. Buying honey from individual beekeepers in remote rural areas was logistically complex and too costly. The project set out to resolve this problem by organizing beekeepers into business groups that would significantly ease the collection of honey in addition to smallholders exploiting the benefits of collective marketing and accessing credit to buy modern hives and processing equipment.

Selected producer groups were identified and developed into viable business units and the plan was to register them with Bee Natural Uganda. They received intensive training from SNV and Centenary bank in production technologies, group management, postharvest handling, finance management, loan management, and collective marketing. Bee Natural Uganda planned to pay individual members through Centenary Bank, making it easier to recover the loans. The rest of the money would then be left on farmers' accounts for personal use.

Those receiving improved beehives on loan were expected to produce 0.75 MT/yr of honey resulting in US\$ 962 each year at a current factory price of US\$ 1.3/kg for comb honey. With this initial investment, honey production is expected to reach 21MT by the end of 2011 and over 70MT by 2012.

However, many problems have hindered progress. Although over 700 farmers were trained in modern bee keeping practices, the lack of focus on important ancillary equipment such as smokers, harvesting buckets and boots hindered production as did the poor weather conditions during the season. The beekeeper business groups have yet to be activated and registered with Bee Natural Uganda (BNU) and so they have not yet been linked to Centenary Bank to access loans to buy improved bee hives. Currently, only 20 individual beekeepers have met the bank's criteria and they have received 548 modern hives, only three of these have been able to pay back loans as scheduled. The relationship between the beekeeper and the bank was not good. There was mistrust with farmers complaining about penalties and high interest rates. Also loans were taking a long time to process. As a result, the bank scaled down the disbursement of loans.

Although this project was welcomed by farmers in the region and the plan for increasing honey production and farmer income was sound it is clear that the expectations by all those involved

were too high and over ambitious. But in spite of these setbacks, honey production in the region has increased by about 20%. However, this has much to do with other government/NGO projects which are providing hives to beekeepers free of charge. Beekeepers are continuing to sell their honey individually with several supplying to private traders who offer better prices than BNU.

Meanwhile, efforts had been made to salvage the project. Stakeholders meetings had been held involving all partners (KT, SNV, Centenary Bank and farmers) to discuss challenges and develop a way forward. The bank had agreed to revisit the upraising criteria so as to enable large numbers of farmers to access the loan. More efforts will be put in the monitoring and evaluation of the project, lack of which was identified as the biggest challenge. BNU will also negotiate the current price offer to farmers to avoid side selling of the honey.

Improving Value Chain of Honey Production and Marketing in the districts of Arua, Nebbi and Yumbe in West Nile region

More Cash from Cashew Nut

Enabling small holders in Tanzania to retain higher proportion of the value

Cashew nut is the cash crop in south-eastern Tanzania – an area with a high prevalence of poverty. However, farm-gate prices offered to farmers have historically been low; middlemen have long taken advantage of producers and monopolies have become an impediment to trade. Bringing farmers together to form cashew producer organisations can provide the catalyst the industry needs to improve and increase production and profitability for smallholders.

Many smallholder farmers who depend on cashew for their livelihoods face problems which they cannot solve alone. These have included: low prices, costly inputs, a lack of capital for investment, pests and diseases and adverse weather conditions.

Smallholders need to be pro-active and get together to address their common problems rather than wait for some outside help. Starting in 2007, a grant from Kilimo Trust through FARM-Africa's MATE, and implemented by Dutch Connexion Limited (DUCON), assisted cashew farmers to improve crop quality and production and to change the cashew value chain in which farmers had little ownership to one in which farmers could substantially benefit by owning the process and adding value to their product. The plan was to establish cashew producer groups and to work towards the Fairtrade Labelling Organisation (FLO) standards which require farmer organizations to be democratic, transparent, and accountable. They also planned for cashew growers to establish a limited company – Masasi High Quality Farmers Products Ltd (MHQFPL) to provide agricultural services to members such as; collective marketing purchase of inputs and extension, access to credit and training.

In 2008, DUCON began working with six villages in Masasi District to facilitate the first of the farmer producer groups, help them to plan their strategies and to build the capacity of the group leadership. Business skills development training was provided and Farmers Field Schools were established to provide the basic farming skills for cashew production.

The project has assisted cashew farmers to add value to their produce and improve profitability. Also by purchasing inputs in bulk directly from manufacturers, the farmers have reduced the cost of, for example, sulphur from US\$1,000/MT to US\$150/MT. Eight well organized farmer groups have now registered a trading company which has delivered excellent self-empowerment to the smallholders. The farmer groups are establishing their own extension service and some farmers have trained as FFS Facilitators.

The progress so far has attracted the interest of other players such as the Food and Agriculture Organisation (FAO) which provided a grant to set up a cashew shelling factory at Maugura. This began operation in 2009 following its launch by the Prime Minister of Tanzania. It is owned by the farmer groups and so the value is added by the farmers rather than by middlemen. The factory is currently valued at US\$75,000. In 2009, the factory processed about 200MT of cashew and can employ up to 190 people in shelling, steaming, sizing, packaging, storekeeping and warehousing.

MHQFPL has signed a contract to supply OLAM – a factory in Mtwara – with semi-processed cashew nuts which has enabled farmers to secure their income as well as farm inputs on credit. Over 1,000 farmers are now involved in the producer groups and they have been awarded an organic production certification from Tancert (Tanzania certification body). They are now preparing for international Fair Trade certification which will enable them to access international markets. Already, MorgenLand, an organic products buyer from Germany, has expressed a commitment to buy all the farmers' produce.

As trading in premium organic cashew grows, it is expected that it will result in better farm gate prices and the cashew will fetch more in the foreign markets helping the farmers to meet the costs of running their expanding business.

Going forward, the plan is to maximise the benefits of farmer certification to produce organic cashew and for Fairtrade, to build a stand alone commercial and profitable MHQFP, increase business units and processing plants, have farmers engage in more contracts for direct purchase of their produce and enable them to penetrate the top niche markets through Fairtrade labelling.

However, there are now strong concerns being expressed about MHQFP pursuing niche European markets, particularly in view of the current economic climate across Europe. This may be the greatest risk to the project. A more stable and sustainable focus may be to focus on producing packed and branded products for local and the EAC markets.

Farmer Comment:

Regina Hamisi, a 38 year old farmer and mother of two children, is also an extension officer who trains other farmers and is secretary of the Mpindimbi group. She says that growing organic cashew pays. A kilogram fetches up to US\$ 0.76 in comparison to US\$ 0.2-0.46 for non-organic cashew. Since she adopted organic cashew farming she has doubled her yield from 1.5 bags to 4 bags on the same land. She is now able to pay school fees for her child in a private school in Mtwara.

Increasing Farmers Income through Improved Farm Management, Organic Certification and fair Trade Labelling of Cashew Nut production in Masasi district –Dutch Connexion (DUCON)/MATF

Regional Trade Alliance for Bulb Onions

Farmers in Kenya and Tanzania reaping benefits from better access to markets

Enhancing Regional Trade Alliances for Bulb Onions Targeting the Nairobi Onion Market Share supported by Kilimo Trust. To retain higher proportion of the value of their produce, farmers in Kenya and Tanzania are forming collective marketing groups to sell their farm produce directly into the commercial markets, enabling them to command prices that yield better margins.

Working in groups rather than independently, smallholder farmers have an opportunity to reap economies of scale and increase their bargaining power to obtain better prices and margins for their produce. They are also able to negotiate and procure better quality farm inputs at lower prices. Together, they can more readily access and share production and marketing information and trends.

Farm Concern International (FCI), an NGO and market development agency in Kenya became aware that poor marketing was constraining the potential gains that smallholder farmers were able to get from producing onions. FCI offers technical support to development projects across sub-Saharan Africa and to market-oriented programmes across eastern Africa. FCI market development initiatives which are benchmarked to private sector market development approaches aiming to enhance the competitiveness of the poor in the market place.

FCI set about bringing farmers together to grow, market and sell their produce in bulk. To develop this plan, they obtained almost £80,000 financial support from Kilimo Trust administered by FARM-Africa's Maendeleo Agricultural Technology Fund (MATF) for a 3-year investment programme.

The project has enabled onion farmers in Nyeri, Kenya and Mang'ola, Tanzania to form producer groups to gain strength from working together and also to form clusters of producer groups called 'commercial villages'. Nine successful commercial villages were formed in Nyeri and Mang'ola comprising 39 farmers' groups who share ideas on increasing production, adding value and marketing.

Each farmer's group has a membership of at least 25 farmers and is well structured with various sub-committees to deal with finance, welfare, marketing and production while others have youth and women

groups. Together the groups have appointed nine members to sit at commercial village level to negotiate and fix prices for bulb onions and to discuss future plans.

Over the 3-year project life, most farmers shifted part of their farming system from subsistence to the commercial production of onions for the market and as commercial villages, they were able to access good technical advice from agronomists and market specialists. This has meant that traditional practices of resource management have been replaced by market oriented practices with the aim of achieving higher yields, higher incomes and improved food security.

In the past on a typical 0.4ha farm, a farmer would normally produce 800kg of onions with an income of US\$110. With new seeds and inputs their income has risen 10-fold to US\$11,000. A total of 2,600 farmers have now entered the scheme and 48 Traders (15 in Kenya and 33 in Tanzania) including wholesalers and intermediaries were identified and linked to the farmer commercial villages. Equity bank has provided training for farmers on credit management and so far 60% have already adopted the culture of savings and use banking services.

Most of the farmers are now directly in contact with market traders. Some now use their mobile phones to call the big markets in Karatina, Nyeri, Nakuru and Nairobi to find out the prevailing market prices of onions before selling to traders or other middlemen who visit their farms. They also use mobile phones to share information. Farmers also now have direct links to wholesalers and this has essentially cut out up to four levels of intermediaries.

Farmers have gained invaluable knowledge and skills on onion production. One farmer says “Long ago, I had no idea what agrochemicals to use in my farm. I knew a chemical is just a chemical. Even if I was sold chalk I would have not known. But after Farm Concern trained us, we now know the best agrochemicals to use.”

“I am now aware of the right kind of seeds and I have also identified a certified supplier where I and my group purchase our inputs,” said the chairman of a commercial village in Endarasha. Previously, farmers planted low-yielding open-pollinated onion varieties because they were cheap. A project officer said “We had to start field demonstration plots to show the farmers that with the hybrid seeds they would increase their costs but they would also get bigger profits.”

There are still challenges for the farmers to face. Community villages are still in a relatively weak position and farmers are still exposed to outside manipulation. But all the group members are upbeat and recognise that the improved farming and marketing practices have changed their lives.

Enhancing regional trade alliance for bulb onions targeting the Nairobi onion market share (erta onion project-smallholder commercialization & market access –Farm Concern International/MATF)

Providing Business Opportunities for Smallholders in Eastern Uganda

Linking the production, processing and marketing of essential oils

High poverty levels and degraded lands are a common feature in Palisa, a district in eastern Uganda. Poor soil fertility and the uncertainties of seasonal rains have led to low yields for the basic food and cash crops on which smallholders depend. In spite of these difficulties high value perennial crops such as citronella and lemon grass for producing essential oils, offer considerable potential for improving farm incomes. They do not require much labour once the crops are planted, livestock do not eat them and they are environmentally friendly.

Essential oils have strong local, regional and international markets for making soap, perfume, and insect. The evidence in Uganda and the region indicates that the demand for these oils far outstrips the supply. The land and climate in eastern Uganda are well suited to growing the grasses from which the oil is processed and a smallholder farmer can earn up to US\$1,000/ha from producing the grasses and more once the crop is processed. But as the crop is relatively new in the area, there has been lack of planting material, knowledge and capacity to produce, process and market it.

In order to capitalize on this opportunity Kilimo Trust awarded a grant of £75,000 to NARO National Crop Resources Research Institute (NaCRRI) to work closely with Pallisa District Farmers Association (PAFA) on a 3-year pilot project to help farmers set up production and processing facilities and commercialise their crops. A value chain approach was adopted with strategic partners in order to strengthen the linkages between farmers and the market. This involved NARO, Ministry of Agriculture vegetable oil development project, PAFA, Rabuong cooperative society, Uganda Export Promotion Board (UEPB) and the Pallisa District Local Government.

The project planned to plant at least 400ha of grass which would be harvested 3-4 times a year, depending on weather conditions, to produce approximately 1,200 MT of cut grass each month. This would be processed into 12 MT per month of Citronella oil worth US\$150,000. Typical smallholders in the project area farm about 0.4ha each and so at least 1,000 smallholder farmers would be needed to grow sufficient quantities of grass.

Processing and marketing are just as important as growing the grass so in addition to establishing grass production on the farms, the project team identified the need for a processing factory close to the farmers on land supplied by the local district government. A supply channel for planting and demonstration materials, the need for additional capacity among the local leadership and farmers, and the development of market linkages and networks in the value chain for essential oils were also recommended.

Two years into the project, the overall production target was achieved and over 2,000 farmers recruited to plant grasses. Poor crop establishment because of poor rains and the initial challenges of planting new crops meant that yields were low – about 1.5 MT/ha – when compared to the potential yields of 25 MT/ha.

There were problems with the local oil processing plant and this has meant that farmers have to transport grass over 50 miles to the nearest plant which is adding to the unreliability of the value chain. The resulting low oil volumes are preventing the main buyers like Mukwano and Rafiki, who demand 3,550-5,000kg of oil per month from signing committal contracts. The impact of this on farmers is that some grass crops are being replaced by other crops and mismanagement is also affecting yields even though farmers recognize that this is the best cash crop opportunity they have.

In spite of the difficulties, farmers are making money by selling grass to the factory and selling planting materials from their first harvest to others in the community.

The potential exists for significant improvements. A reliable processing factory is needed with a grass storage shed. Demonstration and bulking plots for the two grasses are now established in the district, and farmers have now formed 50 producer groups, each with 30 members and a pool of community-based trainers to support them. Training includes on-farm production techniques, which stress the importance of soil fertility to sustain a continuous supply of grass and the importance of protecting the environment by incorporating agro-forestry and fruit trees into the farm cropping pattern. In future the trees will also provide additional income from the sale of fuel-wood to meet the energy needs of the factory.

There are still operational issues to be resolved such as providing an adequate water supply and fuel wood or energy for the factory and organizing transport to take grasses from the farms to the factory.

The project team is seeking to resolve these issues in collaboration with the community and local government including the supply of electricity to the factory and also the community as a whole.

These are all challenges to be faced but they also provide opportunities for new local commercial businesses such as bulk transport services to take grass from farm to factory. There is also a positive impact for the environment as the grasses cover the soil and prevent soil erosion and leaching.

The full impact of this project has yet to be felt among the community in Pallisa. But once the local processing plant is brought back into production the links in the value chain can then fall into place revealing the potential for a highly successful and profitable business.

Production, processing and marketing of Citronella and Lemon Grass oils in Pallisa districts- National Agricultural Research Organization -NARO (Uganda)/MATF

Organic Vegetable Production in Tanzania

Changing women's financial fortunes in Mkuranga

Women in Sotele and Kitomondo villages Mkuranga District, Tanzania have found an affordable and highly rewarding farming venture that is already changing their financial fortunes. In 2005, they began growing and marketing organic vegetables which has transformed the lives of many women who do not usually have much control over income from the sale of main cash crops such as cashew and coconut.

In Mkuranga District of Pwani region in Tanzania, coconut was for many years the main crop which provided household food and cash. A lethal disease meant that farmers lost almost all their coconut palms with devastating impact on income and food security. As an alternative, farmers planted other tree crops and vegetables. However, in view of the growing market for organic vegetables, a project was established in the District to demonstrate the advantages of growing them. This was aimed principally at women who make up over 80% of smallholders. They practise subsistence farming and very few are involved in market-oriented farming. The project was initiated by the Mikochoeni Agricultural Research Institute in Tanzania, with financial support from Kilimo Trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF). Other partners included the Small Industries Development Organization (SIDO), Tanzania Women in Leadership and Agricultural Empowerment (TAWLAE), Tanzania Certification body (TanCert) and Kilimo Hai Tanzania (KIHATA).

Thirty women farmers from each of the two villages were selected during village meetings based on their willingness to participate and to provide labour. The women were organized into groups and the technology was disseminated using participatory approaches such as training workshops, seminars, field visits and demonstrations.

Farmers in Vianzi, Kibewa and Mkugulo villages also took up the technologies as farmers began spreading the knowledge among themselves – farmer to farmer. Many of the local farmers were already growing vegetables without using fertilizers – organic farming by default. However, more farmers ventured into organic vegetable production

with many expanding their cropped areas. By the end of the project, some 200 (project and non-project) farmers had adopted the technology.

As vegetables take only 3 months to mature, the returns on farmer investment was much faster than with other crops. Individual income from vegetable sales increased from US\$3 (TSh4,000) to US\$21 (TSh25,000) per month. The high market demand and good prices for organic produce enabled women to increase their cropped area and yields from 1,210kg/ha/year to 11,400 kg/ha/year. Amaranthus yields, for example increased from 964kg/ha/year to 5,683 kg/ha/year and okra yields increased from 247kg/ha/year to 1285kg/ha/year.

The market was strong and groups soon had orders to supply schools and hospitals. One of the groups – Mshikamano Women Group (MKIWAKI) – opened a bank account with savings of US\$127 (Tsh150,000)/month from the enterprise.

The women still face some challenges, the major one being the limited supply of irrigation water which is important to see them through the long dry spells which are common in the area. Matching demand with the supply also remains a challenge. For instance, SeaClif Hotel and Envirocare Organic shop in Dar es Salaam wanted the group to commit themselves to a regular weekly supply of vegetables (500kg) and fruits (800 kg). Unfortunately, the farmers are not yet able to meet these stringent requirements but they continue to supply schools at village and District level.

Promotion of Organic Technologies in vegetable production for women in Mkuranga District in Pwani Region, Tanzania - Mikochoeni Agricultural Research Institute (MARI)

Local Smallholder Poultry Production goes Commercial in Uganda

Promoting a demand driven value chain alliance of producers of certified organic poultry products

In rural Rakai region in Uganda rearing poultry has always formed part of the livelihood mix of smallholder farming families. It is both a source of income and nutrition for the family. As the demand for poultry products – meat and eggs – is growing among Uganda's urban population due to economy growth there is an increasing individual wealth and dietary changes from starch-based foods to meat and dairy. This has provided opportunities for smallholder farmers to increase poultry production and supply this lucrative market. However they will need support to move from rearing a few chicken for the home and village markets to meeting the rigorous demands of the supply chain that feeds commercial urban markets.

Poultry rearing is traditionally a women's activity which is carried out alongside other household tasks. It is culturally acceptable and enables women to maintain control and ownership over household food and income security. It requires little time, skill and capital input yet the returns can be substantial and the eggs and meat provide much needed nutrition for family.

There is a growing healthy demand for poultry products beyond the immediate needs of the family. One supplier of dressed birds indicated that they had the capacity to take up to 210,000 broilers per year and 570 birds per day to supply supermarkets and hotels in Masaka and Kampala. Another leading supermarket chain in Kampala required 3,500 dressed chickens each week and up to 18,200 a year. The market leader for poultry in Uganda, Ugachic, has sales of 15,000-20,000 birds every month which increases to about 34,000 per month in the festive seasons when demand outstrips supply.

Between 2003 and 2006, Farm Africa's Maendeleo Agricultural Technology Fund (MATF) supported the Community Integrated Development Initiative (CIDI), a local NGO, to implement a project in Rakai District to improve chicken production in rural communities using programmed hatching and exotic cockerel exchange. The project brought benefits to 2,600 families and generated a gross income of over US\$1,000 – the return on each US\$1 invested being US\$16.

Improving local production is only one step in the process of developing a more sustainable business. To supply markets beyond the village requires a value chain that not only improves on-farm productivity but also takes into account the supply chain that links the producer with the market and customers. CIDI built on the success of this first project and between 2009 and 2010, with support from Kilimo Trust, they implemented a pilot project to promote a demand-driven value chain alliance of smallholders to produce certified organic poultry products for commercial markets. They targeted 400 potential poultry farmers in Lwanda, Dhwaniro, Kasaali, Kasasa and Kalisizo sub-counties. CIDI decided to introduce organically reared poultry as this would add value to the business venture and address people's growing concerns about food quality and health.

CIDI recognized the importance of existing institutional structures which would support this project including Rakai District Agricultural Training and Information Centre (DATIC), Rakai District Production Departments, Rakai NAADS, Farmer Producer Groups and Associations, CAPCA, KATUKA farmer consortiums, St Jude Training Centre, Uganda Local Chicken Farmers Association, Indigenous Consultants Research and Trainers (INCORET), Poultry Feeds Suppliers, Transporters, Agro Input Dealers (UNADA) and local traders.

CIDI helped to set up a local poultry value chain management network and producer group network system to improve the efficiency and effectiveness of the poultry value chain in Rakai district and they increased publicity to attract the private sector to participate in this project investment.

Overall, the project has improved the knowledge and skills of smallholders to take up commercial poultry farming as a business and it has improved the market linkages and collaboration along the value chain. There is now a local poultry enterprise model in place ready to scale-up. The project has also boosted financial service linkages but producers are yet to be connected to micro-credit services. Currently they rely on group savings to facilitate group members' access to short term credit for purchasing inputs, services, transport, medical and education services.

The success of Ms Hajara Katushabe from Kabaseeke village in Kasaali Sub County is typical among producers. She purchases day-old chicks from Uganda Local Chicken Promoters and Breeders Association and sells them on to other farmers and traders after one month. She uses manure from the chicks to improve her crops. She now has an income from the sale of chickens and also from surplus maize, beans and vegetables. The increase in household income has enabled her to buy more home necessities such as salt, kerosene and soap and to pay school fees. She is also investing in the construction of new family house and a poultry house.

The market for poultry products is already significant and growing. Poultry farmers may have to consider specialising in particular parts of the market and increase their flock size from about 40/batch of birds to flocks of 200-500/batch in order to take advantage of the economies of scale.

Scaling-up this pilot project will also require critical production issues to be addressed such as feed supply, advisory services, processing, packaging and issues of adding value to the products.

In order to operate a viable poultry business, farmers need investment capital of up to US\$1,500. This is still a problem for most smallholders who do not have access to credit or are afraid to borrow. However, the potential returns are high and the payback period is between 1 and 2 years. For egg producers, the payback period is between 2-4 years depending on the scale of operation and the investment. CIDI estimates that a total investment of US\$365,000 over three years is needed to substantially upscale their pilot project.

There are still challenges facing farmers such as the increasing cost of feed and its poor quality at the same time, high chick mortality, electricity cuts affecting incubators and lack of cold chain drugs. Farmers still do not have access to micro-credit and this is hampering the setup of a feed centre to store supplies.

Promoting a Demand Driven Value Chain Alliance of Producers of Certified Organic Poultry Products in Rakai district to Profitable Markets – Community Integrated Development Initiative (CIDI)

Promoting Fish Farming in Uganda

Introduction and promotion of fish farming in Luweero and Nakaseke districts (IPFFL)

Most communities appreciate the value of fish as an important food source high in proteins, vitamins, minerals and fats. However, fish farming is not widely practised on a commercial basis and fishing communities rely on natural lakes, rivers and reservoirs as the main sources of fish. The potential for fish farming is substantial for improving people's livelihoods and for increasing employment and trade. With funding support from Kilimo Trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF), fish farming was introduced to 120 farmers in Luweero and Nakaseke Districts in Central Uganda.

This was a 2-year project which began in 2005 and targeted smallholder farmers in Katikamu, Kapeeka and Semuto subcounties. Caritas Kasanaensis, the faith-based development arm of the Catholic Church, implemented the project in collaboration with four other partners. The overall objective was to contribute towards better quality of life for subsistence farmers through aquaculture technologies.

Group dissemination approaches were adopted for ease of mobilizing, training and to enable farmers to share challenges and experiences. This also made it easier to mobilize savings and to share labour for pond excavation and fish sampling. Demonstration ponds were established as learning sites to encourage commercialisation. Thirty farmers were trained in fish marketing and adding value to fish products.

Though a modest project, 120 farmers were sensitized and introduced to fish farming in the two districts and fish farming skills improved as a result of the demonstration sites. An integrated revolving fund was established which provided a source of credit that was accessible and affordable by the fish

farmers. Breeder ponds are planned which will help to improve project sustainability by ensuring easy accessibility and availability of fingerlings to the farmers.

A key outcome was the improvement in employment and the use of household labour. One farmer established a market in Kampala and Nairobi for seasoned and smoked fish but the lack of funds to improve and expand the processing unit and the low level of production from local farmers could not yet sustain this market.

One major lesson learned was that a demonstration pond was best hosted by an individual farmer rather than a group so that there is one person who is committed to look after it. It was also important to focus on pioneer farmers to make sure they had a good grasp of the technology and were able to demonstrate productive and profitable ponds.

Introduction and Promotion of Fish Farming in Luweero district –CARITAS

Increasing Cassava Use to Improve Household Incomes in Tanzania

Improving household nutrition and economic security

Cassava is an important source of carbohydrates for both people and animals in Africa. As a result, projects that increase production and encourage wider use of cassava can significantly benefit rural households both nutritionally and economically. A 2-year project, funded by GCF through FARM Africa's Maendeleo Agricultural Technology Fund, promoted on-farm cassava processing and increased marketing channels in three coastal Districts of Tanzania.

The project was implemented in 2005 by Sokoine University of Agriculture (SUA) with the objectives of increasing cassava shelf life and increasing its utilization as processed human food and livestock feed. It also introduced farmers to two high yielding and disease resistant cassava varieties – Kiroba and Cheupe.

Two high yielding and disease resistant cassava varieties were introduced together with manual cassava chippers that save labour, reduce drying time and produce high quality marketable products. About 280 farmers adopted the technology and in two years they had produced and processed 40 tons of cassava for human food as flour and chips compared to previously producing 3 tons for livestock feed with in the same period.

A revolving fund was also set up which enabled farmer groups to acquire processing equipment such as; chippers and milling machines. To improve marketing channels, farmers formed marketing organizations and formed linkages with millers who bought the cassava to mill and sell as flour to supermarkets, such as Imalaseko and Shoprite in Dar es Salaam.

Although the project increased awareness of the potential of processing technology, smallholder farmers were unable to organize themselves to deliver cassava chips to the livestock feed factories located in the city. Farmers were not fully aware of the potential for cassava for livestock feeds and there

was also the problem of Hydrocyanic Acid (HCN) in cassava. When tackling these two issues within the two years of the project cycle, it became evident that cassava processing and marketing of cassava value-added products is viable commercially but these larger markets are currently inaccessible to smallholder farmers.

The increased production and processing of cassava for human food and livestock feed is expected to stimulate increased demand. Cassava based livestock feeds may also help reduce the present over-dependence on maize feeds which are relatively expensive. Tests undertaken by SUA with private companies and farmers have established that cassava use in animal feeds is cost effective by comparison to maize. This has encouraged manufacturers to commit themselves to purchase large quantities of cassava from farmer groups at a guaranteed price.

SUA has also applied these technologies beyond the project with other farmers in the coastal region. For example, over 500 cashew nut farmers have used the lessons learned to organize themselves into processing/marketing groups to increase their bargaining power with buyers.

Based on this work, Sokoine University has published a book on cassava as feed for livestock.

Increasing cassava use for improved household incomes through on-farm processing for human and livestock- Sokoine University of Agriculture

Adopting Silk Production in Kabarole, Uganda

Improving household incomes

The demand for silk, a high value agro-industrial product used to manufacture exotic fabrics, is high at 120,000 tons/yr and prices are good ranging from US\$20-30/kg. In Kabarole District in Uganda the climate is ideal for producing silk. All year round mulberry growth, silkworm rearing and silk cocoon production is possible and so this presented a potential new source of income for smallholders, particularly women, in Kabarole.

Unlike agricultural crops, which produce lump sums after 3-4 months, silk production provides quick returns for farmers on a regular monthly basis.

A project to help smallholders set up silk production was initiated in May 2005 by Kyembogo District Agricultural Training and Information Centre (DATIC) with financial assistance from GCF through FARM Africa's Maendeleo Agricultural Technology Fund. About 80 farmers were trained as trainers, who in turn trained approximately 478 farmers, (organized into 34 groups) on mulberry production and silkworm rearing technologies. New high yielding mulberry varieties were introduced and by the end of the project, 40% of the beneficiaries had established the required area for commercial silk production. A micro-credit scheme was established to facilitate farmers to acquire silkworm rearing houses with appropriate rearing equipment. Using this credit facility, 40 low-cost silkworm rearing houses were constructed.

At the community level, a Sericulture Development Centre was established for silkworm eggs storage and hatchery facilities. Two production units were established – a high-cost silkworm housing

unit costing US\$7,000 (Ushs14 million) and a low-cost silkworm housing unit costing US\$990 (Ushs1,980,000) – both of which are operational. A silk pool marketing system was also set up though only 15% of the beneficiaries were producing silk as the project closed.

Silk production significantly contributed to wealth creation and improved the livelihood for communities in Kabarole. Silk producers in Kabarole District now boast of addressing constraints that had hindered farmers from venturing into this simple but lucrative agricultural enterprise. Direct beneficiaries number 478 households – over 60% headed by women – and indirectly a further 2,230 households benefited from this 2-year project.

Silk production levels are still below capacity as farmers have not yet reached optimal production levels. More than two years are required to break even and to demonstrate the rate of return on silk investment at household level.

Adopting silk production to improve household incomes in Kabarole, Uganda – Kyembogo District Agricultural Training and Information Centre (DATIC)

Promoting Commercial Garlic Seed Production in Kabarole, Uganda

Value addition and access to profitable markets for farmers

Population pressure in Kabarole District in Uganda have increasingly pushed many smallholders to the edge of subsistence and crops like coffee, vanilla, moringa and passion fruits have all been tried without much success. In contrast, garlic production has provided smallholders with a welcome cash crop with quick returns. Two crops a year are possible, unlike crops such as sweet potatoes and cassava which have a 2-year growth cycle. Annual farm incomes have risen to as much as US\$2,470/ha – a six-fold increase on more traditional cropping.

In 2005, Kabarole District Farmers Association (KDFA) initiated a project to transform garlic farming from a backyard garden activity to a booming enterprise that would greatly impact on the livelihoods of smallholder farmers in Kabarole District in Uganda.

Funded by GCF through FARM Africa's Maendeleo Agricultural Technology Fund, farmers improved their profitability and incomes some six-fold. Garlic farmers increased their area from about 0.4ha to 2.8ha and in some cases yields increased by about 90%. Annual net margins rose to as much as US\$2,470/ha. Normally a farmer could expect to earn about US\$370/yr by growing more traditional crops such as cassava or green bananas (*matoke*). Women have particularly benefited from this project and many of the farmer groups that are now organized in parish and sub-county level marketing groups, see a more secure livelihood after taking on garlic production.

The benefits can be seen through more children attending school, iron-clad houses and increased land and cattle acquisition. Communities have also taken up garlic consumption as a cure for common ailments.

The project was implemented in two phases. Phase I, from 2005 to 2007, sought to popularise garlic growing as an alternative income generating crop. Seventy six demonstration sites and 329 garlic seed multiplication gardens were established. In Phase II which commenced in 2008, the scope was narrowed

to three sub-counties – Katebwa, Bukuku, and Mugusu, which form the KABUMU Cooperative. The focus was on promoting commercial garlic seed production and accessing profitable markets. KDFA enlisted 19 seed multipliers from whom the association bought seed stock and loaned it to members. KDFA registered total sales of US\$12,000 from 5,500kgs of garlic seed from 15 seed producers through a pooling strategy, each earning an average of US\$800.

A commission of US\$600 went to the KABUMU Cooperative Society which assisted them to open a bank account and to purchase basic office equipment. KDFA also received additional financial assistance from DANIDA to address the garlic seed shortage. By close of project, about 22% of the beneficiaries had been provided with garlic seed under the seed loan scheme and a total of almost 16MT of Roja seed worth over US\$60,000 was distributed. At a seed rate of 375kg/ha, this was sufficient to plant over 40 ha of garlic. Without this intervention, few farmers would have been able to buy garlic seed which costs about US\$4.0/kg.

The ageing technology is a treatment of garlic seeds with different temperatures and humidity levels to break their dormancy and make them sprout soon after harvest. Traditional seed multiplication methods were slow as they required farmers to skip one planting season to allow germination of the cloves.

The success in popularising garlic farming as a commercial enterprise was largely due to the introduction of a new and improved high yielding variety (Roja) and identifying new markets. Through simple interventions such as seed multiplication and knowledge transfer of such basic skills as row cropping, ageing technology for seed production, deflowering, irrigation and crib construction, KDFA succeeded in getting over 900 growers to adopt the crop on a commercial basis.

By 2007, eight parish marketing groups and 3 sub-county marketing associations had been formed and registered and used the pool marketing system of bulking produce to attract better prices. The pooling strategy also improved group cohesion and marketing associations that made it easier for them to access both financial and technical support.

In 2008, 30 parish-based garlic special interest groups in 3 sub-counties had formed and registered Primary Cooperative Societies that came together under an umbrella organization of KABUMU Garlic Cooperative Marketing Society.

KABUMU formally registered with the Cooperative Department at national level with support from CABCS, which created a good exit strategy for the project. Project beneficiaries are now selling through the cooperative society and have benefited from the pooling strategy. Some 21 storage cribs were constructed for farmer groups so they could collectively market their garlic.

By 2008, at least 25MT of fresh garlic had been harvested, but only about 2MT were sold collectively, benefiting 34 group members. Farmers were also encouraged to consume garlic products in order to create a local demand. Thirty four savings and credit groups were also formed.

The KABUMU Cooperative purchased land and built a permanent fresh garlic store with office space at Mugusu trading centre in Kabarole District. Appropriate processing equipment was purchased in order to add value to products prior to marketing. Over 270 farmers were trained to use the equipment and so far the cooperative has extracted garlic oil which it blends with honey to form a medicinal product that has proved effective against common colds and coughs. Other products are garlic powder, garlic bulbs neatly packed in nets and cleaned garlic bulbs preserved in vinegar. These products were marketed under the KADFEX trade mark.

One significant achievement of the project was the selection of garlic production as one of Kabarole District's Strategic Enterprises under the National Agricultural Advisory Services (NAADs) programme. The District used its own resources to promote production by smallholder farmers and to make it possible for benefits to be felt far beyond the project beneficiaries. KDFA is now recognized as an authority on garlic production and processing. Seed availability though, still remains a challenge.

Overall, there are beneficiaries outside the immediate project as farmers began to practice row cropping, natural resources management on hilly areas and postharvest handling such as crib construction. Crib technology is used to store crops other than garlic and row cropping and integrated pest management (IPM) are being exploited for other crops. It is estimated that more than 1,000 farmers have indirectly benefited from this project.

The society is now seeking finance in order to take better advantage of pool marketing for bulk purchasing from farmers and to continue to add value to products prior to marketing for the benefit of farmers.

Promoting commercial garlic seed production, value addition and access to profitable markets for farmers in Kabarole District, Uganda - Kabarole District Farmers Association

Cultivating Oyster Mushrooms in Tanzania

Increasing food security and farm incomes

Mushrooms are a food crop rich in protein and vitamins. They are also in demand among the main supermarkets and tourist hotels in Tanzania. Mushroom cultivation fits well in Hai District in Tanzania and for smallholder farmers, they offer a good reliable source of income and an affordable food for families whose animal protein consumption levels are very low. The crop has a short growing cycle of 6-12 weeks using simple and cheap housing structures and can be cultivated all year round because they are not weather dependent.

Mushroom growing has strong commercial potential and so in 2005 the Horticultural Research Institute – Tengeru (Horti-Tengeru), with a grant from Kilimo trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF), initiated a 2-year project to promote oyster mushroom cultivation among smallholder farmers. The objective was to improve food security, nutrition and income generation in the densely populated wards of Hai District in Kilimanjaro, Northeast Tanzania. Conditions in Hai District were good for mushroom production. Crop residues such as banana leaves, maize husks and rice straw provided a reliable source of substrates, which are vital for oyster mushroom production. Temperatures were also cool and favourable for mushrooms because of the proximity of Mount Kilimanjaro.

However, the project soon ran into problems as many smallholder farmers, especially the Chagga people, thought that all mushrooms were poisonous, while others considered the crop as an expensive luxury food, ideal for the rich. This explained why prior to the project starting, only 6 farmers in the proposed project area were producing 174kg of mushrooms each year worth about US\$310 (TShs367,000). However, by the end of the project this situation had substantially changed. The number of mushroom growers had increased to 573 and they were producing 16,000kg each year worth US\$42,167 (TSh.49,997,000) to supply Fresh Mark – a bulk buyer of mushrooms – for Shoprite supermarkets and tourist hotels in Moshi and Arusha.

To achieve this, Horti-Tengeru worked closely with partners and adopted a number of approaches to promote the technology. These included: running awareness-raising campaigns in villages and

towns as well as conducting numerous training sessions for farmer groups and extension workers. The training focused on mushroom production, processing, marketing, leadership and governance, group cohesiveness and record keeping. From these activities, selected farmers were trained as trainers for sustainability purposes. Farm and cooking demonstrations were used to dispel the notion that mushrooms were poisonous and to show the benefits of growing and consuming mushrooms.

About 10,000 bottles of quality spawn of oyster mushroom strains with market qualities were distributed. Farmer groups were encouraged to establish group sheds, especially for those with few resources to build their own. This worked well in areas such as Machane central ward where groups like the Nshara Mushroom Group managed thriving oyster mushroom sheds.

In addition to learning about production techniques, farmer groups learned how to preserve and store the crop after harvest. Solar driers and plastic sealing machines were demonstrated to add value by packaging dried and pickled mushrooms. Training also covered mushroom marketing in both formal and informal markets.

The technology was publicised at National Agricultural Shows, popularly known as Nane Nane. The Hai District Council also supported farmers to attend this trade fair and farmers demonstrated production techniques and how to package fresh and processed mushrooms. This Public-Private Partnership not only shared the project costs but also improved production levels, quality, efficiency and profits.

A one-year project extension (ending in 2009) focused on improving farmer access to high value markets. This was achieved by organizing farmers into Business Support Units (BSUs). The BSUs implemented, scheduled and staggered quality mushrooms production and collective marketing after sorting, grading and bulking. This collective action enabled the farmers to pool their produce and provide large and consistent quality supplies. Using a participatory market approach, a number of serious market outlets were identified, including Shoprite supermarket in Arusha which required 30Kg of fresh mushrooms every week. The BSUs were also linked to micro-finance institutions to establish, operate and manage a revolving fund.

The District Executive Officers and District Agricultural and Livestock Officers of Hai and Siha

District Councils committed to train more village field staff to follow-up on quality, production and marketing of mushrooms. With more farmers adopting the technology in Hai District and beyond, organised product marketing by BSU cooperatives will ensure a larger, more regular supply to emerging markets in urban areas.

This project has positively changed farmers' livelihoods through increased earnings and has enabled them to buy cattle, goats, expand mushroom farms, buy furniture, pay school fees and improve housing.

Transfer of Oyster Mushrooms cultivation technology to Hai District for nutrition, food security and poverty alleviation, Tanzania - Horticultural Research Institute – Tengeru

B: Enhancing Market Support Infrastructure

Wholesale Market for Fresh Produce in Kenya

Structuring trade for the 90% of Kenya's fresh produce that is not exported

If smallholder farmers are to improve their livelihoods then they have to take advantage of wholesale markets for their produce. While farmers in most Asian countries already do this, wholesale markets in Africa are falling behind and those that have been developed generally have inadequate facilities and huge problems of congestion, waste and pollution. A recent feasibility study is proposing to change this by developing a new fresh produce wholesale market for Nairobi.

In recent years Asian countries have seen big developments in wholesale markets – in India, Korea, and Thailand – where they are seen as an essential part of the produce marketing system. In China too there has been rapid development of wholesale markets in every town and city following the liberalization of the state marketing system. However, very few markets have been created in East Africa and many of those that do exist were set up long ago in colonial times when the cities were much smaller and the volume of trade was lower. Today these markets are too small and spill over into adjacent, unplanned and generally unsuitable areas. They confuse wholesale and retail market activities and this has all led to the problems of over congestion, waste and pollution.

So why are new wholesale markets not being set up in East Africa? Are they not seen as an important part of the agricultural value chain? A new report argues that they are just as essential to the towns and cities of East Africa as they are to Asia especially for horticultural produce. Such crops are highly perishable and the market is fragmented and volatile making it difficult for smallholder farmers to get reasonable and reliable prices for produce so that they too can invest in the future with confidence. Wholesale markets can provide farmers with effective and profitable marketing outlets for their fresh produce. If they are well located, sized, and managed, they can also be profitably run and provide a stimulus to modernization of food marketing generally. The rapid urban growth in East Africa also means that wholesale markets must play a vital role in channeling a wide variety of produce to urban consumers, even as new distribution techniques, such as direct supply from farmers to supermarkets, are developed. They can also be an important source of revenue for local authorities in the region.

International experience however warns against launching into a wholesale market development programme without proper design and planning. Many new wholesale markets built in Less Developed Countries (LDCs) in recent years have proven to be too large or have failed to attract users and as a consequence have not been financially or economically sustainable. Without a strategic and commercial approach, the risks of developing a “white elephant” project are high.

This idea of wholesale market for fresh produce in Nairobi is not a new one. It dates from 1972 when a number of government and donor reports identified the need for modernized fresh produce wholesale markets in key urban centres such as Mombasa, Nairobi, Eldoret, Nakuru and Kisumu. A range of reasons made only the market in Mombasa to be completed. It opened in 1989 but it has failed to meet its intended purpose of providing both wholesale and retail functions along side each other. Rather it has created confusion, severe congestion, insecurity among produce providers and is a risk to public health.

In 2007, Kilimo Trust and the Gatsby Charitable Foundation (UK) provided a grant of US\$160,000 to the Kenya Gatsby Trust (KGT) to look again at the feasibility of developing a wholesale fresh produce market for Nairobi. Another grant of US\$130,000 was provided for a similar study for a market in Kigali, Rwanda.

Between 2007 and 2008, the project mobilized support for such a market and facilitated public dialogue and awareness. A number of key stakeholders, including the Office of the Deputy Prime Minister, Ministry of Trade, the Ministry of Agriculture, the Ministry of Nairobi Metropolitan Development and the Nairobi City Council offered

their support to establish a modern, private sector managed, wholesale fresh produce market to the extent that a Task Force was convened to undertake a comprehensive review of horticulture marketing and market infrastructure.

Previous plans and studies were reviewed and a fact-finding mission went to South Africa where similar markets have been successfully developed. The Task Force recommended that Nairobi's wholesale market be structured as a Public-Private-Partnership, the main objective being to create a market that offered maximum advantage to smallholder producers as well as contributing to the development of Kenya's food and agriculture sector. The proposal is for a market on a 40 ha site located at Kasarani, approximately 15km north-west of Nairobi, with potential to expand the market in later years as business volumes increase. The Kenyan government has confirmed the project and the responsible Ministries recommended starting fund mobilization from development partners and donors. A project steering committee, including key government and private sector representatives, and a project technical committee of professional specialists were also established.

The study identified the key issues that yet needed to be resolved before the project could proceed to the next stage. KGT, Nairobi City Council (NCC), Ministry of Local Government (MoLG), and other

interested parties needed a better understanding of the key issues, circumstances and prospects for developing a market. A clear financial business plan was also required in order to convince investors and secure the necessary funding.

In December 2008 KGT completed the much needed pre-feasibility study which confirmed the market's financial viability subject to a number of conditions being met. Based on this study InfraCo in partnership with KGT have initiated dialogues with the World Bank, African Development Bank and the African Enterprise Challenge Fund (AECF). This has attracted a commitment of US\$1.5 million to the project with co-funding from AECF. An agreement between InfraCo and the Government of Kenya for a joint collaboration has also been signed and discussions continue on a way forward to implement the project.

The new market will deliver significant public benefits including a more efficient horticulture supply chain, a more reliable and transparent market for horticulture produce, safer and better quality food. It is expected that the market will benefit up to 80,000 smallholder farmers mainly through the sale of vegetables for both domestic and export markets.

Linking Smallholder farmers to Markets: Case study of Nairobi Whole sale market-Kenya Gatsby Trust/ New Nairobi Fresh Produce Whole sale Market

Development of Kigali Whole Sale Market for Fresh Produce

Transferring experience from Nairobi to Kigali

A Rwandan government Crop Intensification Program has led to increased annual production of fruit and vegetables to 2.5 million MT/ year. This has not meant more income for farmers because only a fraction of this is sold, usually at low prices, due to a lack of organised market facilities and postharvest infrastructure to handle perishable crops. A new, well organized wholesale market for fresh produce in Kigali may be the solution. Across East Africa commercial banks are cash-rich but this rarely goes into agriculture.

The Rwandan government identified horticulture among her top priority sectors. Substantial resources were channelled into successfully increasing production but little thought was given to marketing the produce. The market potential for horticultural crops in Rwanda's towns and city is substantial but the reality is a market that is chaotic and unorganised. Farmers are not only unaware of such markets, they also do not have the infrastructure to get produce to market and to store unsold perishable crops in order to reduce postharvest losses.

To overcome these problems, the Rwanda Horticulture Development Authority with financial support from Kilimo Trust are carrying out identification and investment studies. The plan is to develop the Kigali Wholesale Market for Fresh Produce to address the problems in the value chains, reduce postharvest losses using cold store and ripening facilities, allow value to be added to products and enable produce to be sold to both local and regional markets at competitive prices so traders and farmers can benefit from increased income and confidently increase their production and sales. Lower food prices can be expected from improved supply chain efficiency and reduced postharvest losses in addition to improving market hygiene.

The proposed Market could well establish Kigali as a hub for supplying fresh produce to surrounding countries including Tanzania, Uganda, Burundi, and the Democratic Republic of Congo. A new 10,000m² facility is planned on a 20ha site located at Kabuga, Masaka district in Kigali City. By 2030 the site is planned to handle over 300,000MT of fresh produce each year in line with increasing demand. The project will create up to 2,000 jobs within both the wholesale market and in affiliated businesses.

The Market will be managed under a Public-Private Partnership (PPP) arrangement. Wholesale markets in many other countries attract funding from civic authorities because they are considered to be part of the public-owned infrastructure and produce many social and economic benefits like public investment in roads and water supply systems. Such participation, particularly on a 'greenfield' site, would improve the financial viability of the project and also help to ensure the market serves the interests of farmers, traders and consumers and meets government goals of reducing poverty and increasing food security.

Equally important, private investment will reduce the fiscal burden on government, improve the potential for equity growth for private investors and ensure the likelihood of the project's long-term commercial success as a sustainable business. The challenge will be to structure the PPP in such a way that all parties are comfortable with the allocation of rights, responsibilities and benefits.

Based on preliminary financial analysis, market rents inclusive of service charges will be in the region of US\$12/M²/month rising at 5%/yr in real terms as traders' profitability and ability to pay improves. Additional costs may come from optional services such as value adding using cold storage and banana ripening facilities. These charges are affordable and competitive compared to those facing traders at Kigali's existing markets. Further consultations with traders will need to confirm they are willing and able to enter into lease agreements at these rates. Small traders and farmers will be encouraged to participate by offering leases on small individual trading units and incorporating a separate "daily market" sales area.

The total cost of the project is estimated at US\$31.4 million. Although the projected IRR is less than 5% because of the high initial upfront costs, in later years, once there is a trading record, it should be possible to refinance and expand the Market using commercial finance.

This project is well worth pursuing because of its potential to deliver significant benefits to farmers, traders and consumers. The next step is to complete the feasibility and planning stages of the project, to enable the Government of Rwanda to make the final funding decisions.

*Kigali Whole sale Market for Fresh Produce-Rwanda
Horticulture Development Agency (RHODA)*

C: Building and Financing the “Missing” Medium Scale

An Innovative Loan Scheme for Agricultural Value Chains

Engaging commercial banks in Tanzania and Uganda

Although the agricultural sector generates 50-70% of national incomes and is the region's largest employer, it receives less than 3% of total commercial lending. Even then, agricultural investment focuses on plantations, horticulture and export crops. Agricultural SMEs of producers are largely neglected, even though they are the principal contributors to food security in the regional economy. They are considered too risky for lending. Will this new scheme redress the balance? There are several reasons why banks are reluctant to give loans to smallholders. They lack usable collateral; there are high transaction costs in servicing remote clients; and there are interrelated risks from unreliable rainfall, lack of irrigation, pests and diseases and price fluctuations. The lack of affordable financing is a major obstacle to the development of thriving agricultural SMEs along the value chain. Similarly, commercial financing is largely unavailable to entrepreneurs seeking to build businesses that could boost the region's food production and enable SMEs to earn a profit.

To address these disparities, Kilimo Trust in a joint effort with AGRA, is working to institutionalize, within the commercial banks, credit products for the agricultural sector particularly for smallholder farmers and SMEs participating in key value chains. The program is designed to leverage US\$50 million of loans to SMEs. The scheme is available over 3 years – with repayments within the next 5 years – and targets entire value chains for specific commodities such as maize, rice, sunflower, beans, sorghum and barley. Loans totalling 60% of the capital investment are available to smallholders through their associations or registered companies and 40% for formal businesses dealing with inputs and output markets that support smallholder agriculture. This includes support for primary production, post-harvest handling, storage, processing, transportation and trade in agricultural inputs and produce. The scheme was initiated in November 2009 and is the largest single effort of any bank to lend at scale to agriculture in Tanzania and Uganda.

This partnership arrangement was designed to achieve three key objectives.

- Expand lending to the agricultural sector by bringing a significantly large volume of lending to the sector through innovative risk sharing arrangements.
- Stimulate a large proportion of producers and SMEs in agricultural value chains to access commercial financing and in the process build assets, enhance their credit history and rating and graduate as attractive clients of commercial financial institutions.
- Build a database on the performance and benefits of commercial lending to the agricultural sector that will allow banks to establish a better estimate of the true degree of risk associated with lending to the sector and provide justification for grant funding to remove genuine weaknesses inherent in the credit support environment.

The participating banks have made tremendous efforts to deliver the loans and have recruited agricultural experts as part of the banks' management team. In Uganda, the team has rolled out branches countrywide, committing over 50 staff to the program. Significant loan amounts have already been approved and disbursed in both countries. By the end of December 2010, a total of US\$ 5 million had been disbursed or approved to 16 SMEs and Producer Groups targeting over 46,000 smallholder farmers. A further US\$6.6 million to another 10 organisations was in the pipeline.

Overall, the envisaged outcome of this innovative loan scheme is that

- Farmers become a viable and valuable client base.
- Working through large groups will enhance the buying power of individual farmers, providing them with cost effective access to input materials and increase price stability.
- Through accessing commercial financing, a large proportion of farmers and agricultural businesses can work to transform their subsistence farms and enterprises into sustainable, viable commercial activities and thereby build assets, enhance their credit rating and build self-sustaining, profitable enterprises.
- Sustainable financial service models and products will be implemented by other commercial banks.

From a farmers' perspective, they would like better BDS accompanying these loans so that they can get the best out of them. They also wished to see loan approval times reduced, particularly in rural areas where Bank access is limited. One coffee farmer said that he could not take advantage of high coffee prices because of delays in approving his loan.

The Main Lessons So Far

- a) **Loans should not be taken/given unless the conditions are optimal:** It is important that optimum conditions for success are first created within the banks as well as among the borrowers (especially smallholder producers of food commodities). For example, the qualifying and mitigated lending criteria need to be rigorous

enough and/or implemented rigorously. Consistent teams with an understanding of agricultural value chains dominated by smallholders – is a basic requirement within the participating banks. Technical assistance and mentoring of borrowers need to be adequate but must be driven by rigorous due diligence by the participating banks. Furthermore, there should be very high level of coordination of different elements of the scheme (special purpose vehicles identification, vetting and supervision, insurance cover, due diligence and technical assistance).

- b) **Build commercial business entities of producers first:** producers should be assisted to organize into viable business entities and loans should only be given against a credible business plan showing that the borrowers will be able to service the loan and remain with decent income to meet their daily needs. If these steps are skipped or are not implemented fully, then more often than not the borrowers will fail to service the loans.
- c) **Loans to finance farm expenses for a single season – are often subprime:** farmers should not be encouraged to take short-term loans to finance seasonal farming operations as this kind of loans often (i) only benefit input and service suppliers, and (ii) are seriously exposed to the changes of weather. Even where the business plan justifies a short-term loan for seasonal expenses, the loan financing should not exceed 40% of those expenses.

An innovative Loan Scheme for Agricultural Value Chains – Kilimo Trust and AGRA partnership

Empowering Farmers to Effectively Exploit Markets

Building assets of cooperatives and SACCOs to operate WRS independently

Following completion of modern warehouses in Western Uganda, nearly 2,000 farmers are commanding premium prices of 30% above the average prices for maize, beans, sorghum, cotton, and coffee. This is a result of two Area Cooperative Enterprises (ACEs) and two linked Savings and Credit Cooperatives (SACCOs) in western Uganda being empowered through a warehouse receipt system (WRS) owned and operated by the farmers themselves. This has led to both ACEs securing contract farming agreements.

Cooperatives are a well-established means of bringing farmers together in many countries so that collectively they have much more influence over agricultural inputs and outputs by integrating production, marketing and financial services. In the USA, 18% of electricity is owned and used by cooperatives; in Japan over 90% of farmers are involved in cooperatives and in Switzerland, cooperatives are the largest employer. In Uganda cooperatives are relatively new but they are beginning to transform the way in which disadvantaged smallholder farmers work.

The Uganda Cooperative Alliance (UCA) has transformed the cooperative movement in Uganda into commercial organizations able to transact and make profits while benefiting their members. Farmers are taking advantage of this opportunity to engage in organized production and marketing for better prices and services. New cooperative marketing systems have been piloted in Katerera and Kisiita based on Area Cooperative Enterprises (ACEs) that add value and market products on behalf of farmers and earn income in the form of commission on sales. With assistance from Uganda Cooperative Alliance (UCA), farmers used a grant and soft loans from Kilimo Trust to help produce and profitably market their grain through a warehouse receipt system (WRS) owned and operated by the farmers.

Prior to this, the cooperatives had no means of storing grain and so they were forced to sell grain just after harvest when supply is high and prices are low. Under these circumstances, farmers had no say on price and as a result incomes both for

individual farmers and the organizations were low. With a soft loan of US\$100,000, two grain stores were constructed, one for each cooperative; US\$40,000 was used to strengthen savings and credit cooperatives – known as SACCOs – to provide loans to farmers; and a straight grant to build their capacity for organizing and running the WRS.

The results so far have been excellent. Both cooperatives have been able to market their members' produce at prices up to 22% above local market prices, the target was 15%. Expenditure is also down on farm inputs, being 10% less than local market prices as farmers are now able to purchase inputs in bulk. Reliable storage and funding has meant that farmers are now investing in improved seed varieties and linking with input suppliers. Farmers are also moving from hand hoes to tractors to improve productivity.

By mid 2011, over 850 farmers were enjoying the benefits of the WRS and some 5,000 farmers were directly benefiting from the warehouses. The process was under way to register the warehouses with the Uganda Commodity Exchange (UCE).

One of the cooperatives, the Kisiita ACE has secured an annual contract to supply 4,000MT/yr of sorghum to Nile Breweries (over a 5-year period), 580MT/yr of maize to the World Food Programme and 200 MT/yr of sorghum seed to a private seed company. They also employ their own extension staff to support members. Furthermore, due to reliable storage and guaranteed markets and premium prices, farmers have increased the use of improved varieties of seed and tractors to improve productivity and expand production.

The two SACCOs linked to the ACEs have jointly increased their capital base (share capital and saving deposits) from an equivalent of US\$ 268,990 to US\$ 459,560 enhancing the financial ability to operate the WRS.

The cooperatives are now moving into contract farming. Kisiita has contracts as above. The contractual obligations have been met for both quantity and quality and they have now been selected to benefit from a USAID grant under Market Linkage Initiatives to buy warehouse equipment.

Opportunities now exist for investment in input supply including solar energy use, milling and seed production particularly in view of the 8,000 farmers in the two sub counties who are interested in joining the cooperative system.

The demand for cooperative services is growing faster than the ACEs can currently cope with and the UCA has limited resources to help. Increased business also means increasing pressure on the limited number of managers who are becoming over stretched. Tractor hire services are still limited compared to the number of farmers who want to plough which leads to delays in planting. ACEs still lack warehouse equipment like dryers to minimize losses especially during the wet season. All these are issues that can be resolved with the right investment.

Possible areas of investment

The increased market and bulking stimulated by the WRS project has encouraged ACEs to invest in modern technologies. For example, Kisiita ACE has acquired a second tractor which has enabled farmers to plough more land. The best and most sustainable solution is for the private sector to establish tractor hire businesses and charge a commission for this service.

There is a possibility of exploiting the outside markets like Southern Sudan, Eastern Congo and Rwanda. There is an influx of returnees in Southern Sudan who need mostly maize and beans before they can settle to produce their own crops. Already UCA is in talks with companies like Aponye and Maganjo Grain Millers of Uganda which export grains under contract farming arrangements.

UCA and Rwanda Cooperative Agency (RCA) will soon witness the signing of a Memorandum of Understanding for trade in beans and maize. The two have collaborated for 2 years now to promote trade and build capacity. This will help the ACEs to expand their markets.

Empowering Farmers through Innovative Marketing System – Uganda Cooperative Alliance

Mainstreaming Commercial Private Clonal Nurseries

Micro-credit for entrepreneurs in Kenya

The private sector in East Africa is embracing clonal forest technology to produce disease-free Eucalyptus plantlets that grow faster and have many desirable attributes. This is beginning to transform wood production on which the region depends for over 90% of its energy needs and construction materials. There are many low-income households in the region that could also benefit from this technology but they do not have access to investment capital and so it is beyond their reach. However, new and innovative micro-credit facilities to establish tree nurseries is changing this perception and provides smallholder tree growers with opportunities to take advantage of this important and growing industry.

Smallholder farmers are the backbone of agriculture in East Africa and trees are another crop they can grow and sell to improve their livelihoods. Local timber varieties are slow growing and returns on investment do not come for many years. Clonal forest technology offers *Eucalyptus* plantlets which grow much faster and produce high quality timber for fuel-wood and for construction. For smallholders to grow this crop they need access to planting material and this means a supply chain of local nurseries is needed to produce and market them. Local small-scale entrepreneurs were willing to do this and set up nurseries. However, most lacked investment capital and traditional lenders are reluctant to finance small nurseries because they are considered high risk. Thus, lack of appropriate financial products has greatly hindered the adoption of a proven technology that would go a long way to improve the livelihoods of the smallholder tree growers.

To overcome this hurdle, Kilimo Trust funded K-Rep Development Agency in Kenya to develop and test credit products for smallholder commercial nurseries. This included a grant of US\$58,000 to cover staff and administrative costs and an interest free credit component of US\$139,000.

In 2007, K-Rep began by establishing a commercially viable credit facility for tree nursery entrepreneurs trained in clonal forestry technology. They also helped entrepreneurs to raise the standard of nursery production by establishing modern low-cost clonal propagation units across the country.

In order to qualify for credit, nursery owners first spent two weeks training in clonal technology at the Karura Forest Technology Resource Centre. They were then required to invest 10% of their own funds up-front as collateral to secure the loan and were given four months grace period before repayments were required.

Upto June 2011, K-Rep provided loans to 68 nurseries across eight provinces in Kenya totalling US\$132,000. A typical loan was about US\$3,000. Together the nurseries have produced over 14 million plantlets. In spite of this, some nursery owners left the project because it was making losses. Critics suggest that the project was too thinly spread which made monitoring difficult and costly. Government was critical of the water requirements for *Eucalyptus* which dissuaded farmers from planting them and this reduced the market for the plantlets.

Nevertheless, the market for clonal tree plantlets is immense given the region's dependence on wood for energy and for construction and the growing demand for wood products as the population increases. K-Rep, with support from Kilimo Trust, is the first institution to provide credit to small nursery entrepreneurs and has generated good lessons for scaling-up.

Credit Scheme for Private Clonal Nurseries in Kenya-K-Rep Development Agency

D: Commercializing Technical Innovations

Unlocking Cereal Production Potential of East Africa

Building 'striga smartness' into cereal production systems, investment and policies

Striga is the most pervasive and damaging parasitic weed threatening cereal production in East Africa. Each year, millions of tons of cereals are lost because of Striga. The knowledge, technologies and practices required to eliminate the Striga threat to food and income security have been perfected and yet the threat continues to grow. Action is beginning in Kenya, Uganda and Tanzania but much more will be needed to bring this threat under control.

Striga is a virulent and pernicious weed that drastically reduces the yield of all the major cereal crops – maize, sorghum, upland rice, and millet. It has already infested about 600,000 ha of maize and by 2020 this is expected to exceed 1.0mha if action is not taken. In Tanzania almost 1.0 million ha of cropland is infested with the greatest severity being around Lake Victoria. In Kenya some 340,000 ha is infested, again around Lake Victoria, while in Uganda, it is now over 100,000 ha. In monetary terms the annual loss of maize, the main cereal crop in East Africa, amounts to about US\$ 437 million. This is more than US\$1.0 million a day!

Striga works by attaching itself to the roots of cereal plants. It drains the plants of nutrients, minerals and water which reduces yield and in many cases kills the host plant. Striga is persistent. Each mature Striga plant produces about 50,000 small dust-like seeds which remain viable in the soil for up to 20 years awaiting a suitable host. Farmers often unwittingly spread them across farms, districts and countries. The core problem is the rate at which Striga builds its "seed bank" in the soil. If left unchecked, the intensity and area of infestation grows rapidly and exponentially. The volume of seeds and the ease with which they can spread means that re-infestation is a serious problem.

Developing a Regional Programme to Control the Striga Threat

A programme to tackle the Striga threat began in 1994 with support from the Gatsby Charitable Trust. Between 2006 and 2009, Kilimo Trust took over and provided US\$1.6 million for an international collaborative research effort, led by the International Centre for Insect Physiology and Ecology (*icipe*) to develop a biological approach to controlling maize

stemborers and Striga called 'push-pull'. This is a multi-purpose biological control technology that not only suppresses and eliminates Striga in cropped fields but also controls stemborers, improves soil fertility by fixing nitrogen and reduces soil erosion. Push-pull involves intercropping desmodium, a fodder legume, between cereal rows (maize, sorghum, millet and upland rice) with a surrounding crop of Napier grass. Desmodium reduces the level of Striga infestation and the Napier grass traps the stemborers. Both desmodium and Napier grass provide forage for cattle and goats.

This technology was successfully developed and tested with on-farm trials involving more than 3,500 farmers in 15 Districts in Kenya and 5 Districts in Uganda. As a result of this initiative, some 25,000 farmers in Kenya, Tanzania and Uganda adopted the technology and are able to control Striga on their farms, produce more food for home consumption and sell surplus for cash.

Alongside this work, other organisations both public and private have developed and validated other methods of control. Examples include the production of resistant sorghum varieties, IR-Maize technology developed by the International Maize and Wheat Centre (CYMMIT) and promoted in the region by African Agricultural Technology Foundation (AATF) and the use of soil fertility improvement technologies. Striga has been shown to thrive in soils where fertility is poor. Indeed, Striga is seen as a 'poor man's problem' and threatens the staple food production of over 35 million impoverished people in the region.

In October 2009, the Push-Pull platform technology was highlighted in a watershed publication of the Royal Society in UK entitled “Reaping the benefits: science and the sustainable intensification of global agriculture”. This recognized that ‘push-pull’ is a highly successful technology for integrated pest management. Kilimo Trust is very proud to have been associated with the development of this platform technology.

Despite all this successful research, the uptake of these new technologies has not been commercially widespread. A study to assess the reasons for the lack of uptake suggested that there were broad concerns among smallholders about the volatility of the grain market, the tendency of farmers to work in isolation and a general lack of a clear commitment from governments to promote these technologies. At farm level, there was a general lack of awareness of Striga control technologies. Where farmers knew about Striga control, criticisms included: inputs were not readily available or were too expensive, methods were not appropriate to the existing farming systems and the low level of commercial farming was not conducive to investing in control technologies.

What has become clear however, is that Striga cannot be eliminated by a single method but it requires a combination of different technologies and practices, strong collective action, and strategic public and private sector investment. In fact, a regional strategy is needed because Striga infestations do not respect national boundaries.

To achieve this, Kilimo Trust is spearheading the development of a wide-ranging regional programme to tackle the Striga threat. It brings together all the key stakeholders from across the region. It recognises the overwhelming need to control Striga and the need for a regional consortium of organizations to mobilize private and strategic public sector investment to scale-up the technologies to cover all cereal crops threatened by Striga in the EAC region. The consortium commissioned an Ex-ante Impact Assessment, completed in 2009, to support the development of a detailed programme and quantify the expected benefits. It reported that, significant gains would be achieved across the three countries if the threat of Striga is controlled

or eliminated. Up to 2.2 million MT of maize and 750,000 MT of sorghum could be added every year to the current production levels across East Africa. A video documentary on the impact of the project was produced and disseminated to stakeholders.

Kilimo Trust then funded ‘next step’ initiatives with organizations and institutions in Kenya, Tanzania and Uganda to develop and implement pilot projects to deploy these technologies and unlock the true potential for cereal production in the region. The pilots include the Tanzania Ministry of Agriculture, Food Security and Cooperatives, Rural Urban Development Initiatives (RUDI), Uyole and Ukiriguru Research Institutes in Tanzania; Maseno University, Resources Projects, Kenya Agricultural Research Institute, in Kenya and National Agricultural Advisory Services (NAADS), Serere National Semi Arid Resources Research Institute in Uganda and the districts’ local governments in the three countries. The international research centres of icipe, AATF and CYMMIT provide backstopping to the country project teams.

Establishing the Building Blocks in Kenya

A study was undertaken with the aim of understanding the obstacles to adopting the strategy and mapping value chains to promote scaling-up of these technologies. Base line surveys with over 2,000 farmers showed that an appreciation of Striga control varied from place to place. In Gem district, 75% of farmers were unaware of the range of technologies available whereas in Emuhaya district awareness was much higher at 40% although cash constraints limited uptake. However, according to the African Agricultural Technology Foundation some 50,000 farmers were familiar with IR maize technology and the annual demand for seed, which is expected to rise, outstripped the supply of only 30MT from the Western Seed Company.

Staff from the Ministry of Agriculture facilitated extensive field trials and demonstrations to show how the technologies work and to gain the commitment of all those involved in the strategy and their willingness to participate in scaling-up of the technologies.

On the basis of this work the various actors in the cereal value chain were identified, such as, the seed industry, agro-dealers, producers, retailers, wholesaler and millers. The kinds of interventions associated with each player were also identified, such as, guaranteed seed from the seed industry and credit services for agro-dealers and farmers. It was estimated that, the total investment required to scale-up Striga technologies and create business opportunities will be almost US\$3.0 million over a five years period.

Bringing Stakeholders Together in Tanzania

A pilot phase, similar to that organised in Kenya was set up to test and demonstrate Striga control technologies and to increase stakeholder awareness and build capacity at village, district and national levels. It was implemented by Rural Urban Development Initiatives (RUDI), a local NGO in collaboration with the Ministry of Agriculture, Food Security and Cooperatives (MAFC). Demonstrations took place in 21 farmer field schools and a total of 300 farmers, 50 extension officers and 15 agro-dealers were trained in the use of striga control technologies.

Local government authorities were sensitized to include Striga control in their District Agricultural Development Plans (DADPS). Technicians were trained to monitor the Striga seed bank in the soil and collaboration between agriculture research Institutes of Uyoile and Ukiriguru facilitated the development of extension messages and training.

Specialist seed is not yet available in Tanzania. It is estimated that 100MT of IR maize, at a cost of US\$250,000, and about 10MT of desmodium seed for the 'push-pull' technology, at a cost of US\$300,000, are needed to supply farmers in Tanzania's 10 districts. IR maize seed has already been registered in Tanzania and will be supplied by a private company to be identified.

Successful control of Striga when combined with improved postharvest handling could raise maize

yields from 1.5 MT/ha to 3.5 MT/ha and increase annual maize production from 3.5 million to 4.9 million MT. The aim is to ensure that by 2015, Striga will no longer be a threat to yields of maize, sorghum and rice on 60% of cropped lands which are currently infested across Tanzania.

An additional US\$1 million was also identified to support a national Striga control programme which will require resources and multi stakeholder participation both at national and at district level.

The government has declared Striga as a national pest and is registering the IR Maize as a recognised Tanzanian variety, Tan 222. It is also developing a conducive environment for investment in Striga control.

Creating Momentum in Uganda

Due to unavailability of IR maize and desmodium seed in Uganda the focus was on sorghum and community seed multiplication in Pallisa and Kibaale Districts to produce three varieties of Striga resistant sorghum. NASECO Ltd, a commercial seed company, also adopted and planted 6ha of Striga resistant sorghum.

Trials were established in 6 districts (Iganga, Namutumba, Busia, Tororo, Kumi and Pallisa) to demonstrate Striga control measures including the use of Striga resistant sorghum varieties, IR maize, 'push-pull' technology, soil fertility management and sorghum legume intercropping. Training was also undertaken in Striga biology and data collection methods. These activities created a demand among farmers for Striga resistant sorghum seeds.

Surveys are on-going to assess the severity of Striga infestations based on field investigations and soil sampling to determine the extent of the Striga seed bank in the soil.

The pilot project also looked at ways of mainstreaming Striga control in both the government NGOs and private sector programs which has led to the districts of Tororo and Pallisa to include striga control activities in the 2011/12 budget.

The Government of Uganda has adopted a proactive approach and has incorporated Striga control in the Development Strategy and Investment Plan (DSIP) of the Ministry of Agriculture Animal Industry and Fisheries. A national Technical Working Group (TWG) whose membership includes public agricultural research institutions, policy makers, private sector organizations such as seed dealers and rice processors, NGOs, training institutions such as Makerere University and the national public Extension service (NAADS) has been established and tasked with coordinating Striga control efforts.

Funding, however, remains a big constraint. It is estimated that for an effective Striga control over US\$6 million is required over the next five years.

What Next?

Eliminating the threat of Striga can unlock the cereal production potential in East Africa but it can take up to 20 years to do it. To achieve this will need a multi-faceted approach, strategic scaling-up of all the available technologies and practices; actions by many different people and institutions as well as need for public and private sector investment and donor support. It will require action on a regional scale. The approach should include:

- Farmers implementing relevant combination of technologies/practices on their farms,
- Research organizations improving technologies/practices and benchmarking and monitoring infestations,
- Extension services effectively supporting improvement of the knowledge, skills, capacities and practices of key actors,
- Financial institutions providing the needed financing,
- Agri-business providing agricultural inputs as well as handling and marketing for surplus production and
- The public sector (governments and donors) providing catalytic financial support.

Kilimo Trust is now inviting all stakeholders to support the regional Striga control programme comprising two 6-year phases with the aim of substantially increasing maize, sorghum, rice and millet on the 60% of currently infested cropped land. Kilimo Trust estimates that to effectively eliminate the Striga threat across the three countries would require an investment by farmers and other private players of US\$ 380 million. It is also estimated that about US\$ 40 million in public sector investments would be required to support the private sector.

East African Regional Taskforce on Striga

Enhancing Beneficial Conservation

Mainstreaming clonal forestry technology for tree growers in East Africa

Over the past 10 years Kilimo Trust and Gatsby Charitable Foundation (UK) have invested US\$3.6 million in the Tree Biotechnology Programme (TBP) to bring the benefits of clonal forest technology to smallholder farmers in Kenya, Tanzania and Uganda. To date, some 21 million trees with an estimated value of US\$300 million have been supplied by over 80 nursery businesses to about 20,000 growers in the three countries. The Programme has contributed immensely to the current global effort of Reducing Emissions from Forest Degradation and Deforestation (REDD).

Wood is an integral and vital part of the lives of most people in East Africa. Poor rural and urban communities, in particular, rely wholly on wood for energy and construction. In 2007, the demand for wood in Kenya, Tanzania and Uganda was over 94 million cubic metres, 90% of which was for fuel-wood which meets more than 90% of the countries' energy requirements. Increasing populations means that in many areas demand is beginning to outstrip supply. Indigenous trees are slow-growing and cannot keep up with demand and estimates suggest that these three countries will become net importers of fuel-wood in the 2020s. National governments are most concerned about this demise in natural forest resources and the need to increase wood production. In Kenya, the only country in Africa with less than 10% forest cover, the government has put in place measures to significantly increase the forest area. It is promoting farm forestry and the intensification of dry land forest management. There are plans to bring in the private sector to grow industrial plantations and promote community participation in forest management and conservation. The key question however is how will this be achieved?

A most promising way forward is to grow *Eucalyptus* using clonal forestry technology. *Eucalyptus* is not new to east Africa. It has been grown extensively in Kenya, Uganda, Tanzania and also in Ethiopia over the past century, particularly by smallholder farmers and is proven to be one of the best tropical tree species for bio-energy production. The clonal technology is adding a new dimension to *Eucalyptus* production. Clonal technology is radically changing

the way in which *Eucalyptus* plants are selected and grown and it offers a means of producing planting material from selected sources with highly desirable growth characteristics that result in superior timber with high calorific value. Instead of growing directly from seed, source material is selected for cuttings from which new growth is taken for propagation.

Over the past 10 years, Kilimo Trust and Gatsby Charitable Foundation have invested nearly US\$4 million in the Tree Biotechnology Programme (TBP) to bring the benefits of clonal forest technology to smallholder farmers in Kenya, Tanzania and Uganda. This flagship programme has supported the introduction of clonal planting material and techniques and the development of private, smallholder tree nurseries to produce and market the tree planting material. Cuttings of superior quality were screened in research trials across East Africa in a partnership with Mondi Forests Ltd of South Africa to select and introduce *Eucalyptus* hybrids that are well suited for smallholder farmers in East Africa to ascertain their superior quality and growth under local conditions in different agro-ecological zones. How the wood will be used also influenced the screening process. Fuel-wood for example, is selected for trunk straightness as this minimises air gaps in fire-boxes and ensures a more efficient burn.

Profitability can only be enhanced by developing strong value chains from nurseries to markets for differentiated wood and non-wood forest products. East Africa's population continues to grow and so too does the demand for fuel-wood and wood products

for construction and fencing. Natural forests and woodlands across the region cannot keep pace with demand and the resulting deforestation is degrading the environment. Clonal forestry technology offers a solution to this problem. It can significantly and sustainably increase wood production by reducing growing times, improve productivity and wood quality, increase profitability and take the pressure off natural forest ecosystems. Moreover, it offers a commercially viable product that can bring together both public and private sector interests to the benefit of both. Over 80 smallholder private nurseries were established to commercialize the cloning techniques for producing and marketing tree planting materials which included the introduction of production technologies such as mist-beds, traditional nursery, greenhouse and tunnel technologies for hardening off the plantlets. Support on the farms was also important in establishing the most appropriate planting methods including good land preparation, planting techniques, weeding and pest control with well trained farmers to complement – all necessary requirements to realise maximum production and profitability. Thus in addition to producing plantlets from the clones, the project has also facilitated the production of tree seedlings of other tree species, which other farmers buy.

Using moving average prices/value of trees (US\$ 0.18, US\$ 4.5 and US\$ 75, for 0-3 years, 4-5 years and over 5 years-old trees respectively, it has been estimated that the generated value in terms of well-established trees, translates to US\$ 370 million, nearly 100-fold higher than investment in the Programme. Furthermore, small-scale commercial nurseries are making profits of about US\$ 17,500 for Kenya, US\$ 14,286 in Uganda and US\$ 10, 000 for Tanzania per year.

Tremendous Success and Impacts in Kenya

Clonal forest technology production is most advanced in Kenya where the Tree Biotechnology Programme Trust (TBPT) of Kenya first introduced Eucalyptus clones in 1997. Following the research trials to establish the best clones and with the establishment of a central clonal nursery in Karura, Nairobi, the TBPT now supplies plants to private nurseries, woodlots and plantations and estimates

that more than 21 million plantlets and seedlings have been distributed nationally, mainly to smallholder farmers in rural areas. Additionally, TBPT has helped to create over 2,500 jobs in forestry sectors in areas of private nursery business and woodlots management. Substantial growth is anticipated in wood utilization including such industries as; wood preservation, pole treatment, charcoal production, chipping and wood pelleting enterprises.

The TBPT has also supported the formation and registration of three key commodity associations in Kenya – School Woodlot and Energy Management Network, Kenya Forest Growers Associations and Forest Tree Nurseries Association of Kenya to represent the interests of smallholders along the product value chain.

Eucalyptus is also benefiting Kenyan schools and the environment. Many schools now burn sustainably-harvested wood and coupled with use of energy saving cooking stoves they have reduced carbon dioxide emissions by about 1,400 tonnes as well as saving 400ha of natural forest from degradation. For more information visit www.tree-biotech.com.

Commercial Outcomes in Uganda

A similar process of transferring and testing clonal forestry technology and building local capacity to produce the planting material began in Uganda in 2002. This project is now in its second phase and covers all aspects of scaling-up clonal forestry to supply quality tree products, increase rural employment and improve environmental resilience. With a central nursery in Kifu, Mukono district, and regional nurseries in Kabarole, Mbale and Lira districts, to date over 500 smallholder farmers (32 of them women) have together planted 2 million Eucalyptus plants on 1,900 ha in 45 districts across Uganda. The establishment costs are US\$700/ha which represents an investment of US\$1.3 million. The plants are showing a high survival rate – over 90-95% of plants survive in comparison to 30-50% with conventional seedlings. Yields of between 20-58 MT/ha/year are expected – about 3-6 times the yield of conventional seedlings. In addition an independent seedling nursery business has been established to supply the planting material with a

capacity to produce and sell up to 3 million clones and seedlings annually. It operates on a commercial basis and generates gross annual sales of US\$340,000.

Scaling-up in Tanzania

The TBPT programme followed in 2003 and following research trials, established a central nursery in Kwamarukanga to mass produce clones commercially for both local and international markets. Small nursery businesses for distributing clones have been set up and local entrepreneurs trained in Tanga, Kibaha and Mufindi. This has created over 400 jobs in both nurseries and in plantations. During the course of the project it is expected that the central nursery in Kwamarukanga will produce some 3 million plants a year with an additional 1 million plants coming from the smaller nurseries.

What next?

Although clonal forest technology is currently more expensive than traditional tree planting methods, the extra costs are more than justified by the additional benefits that come from trees which grow faster and produce high quality wood which has the potential to meet current and future wood market demands in the region. Attitudes are changing towards growing Eucalyptus using clonal technology rather than from seedlings which is demonstrated by the increase in sales of clones.

The initial target of the programme was to supply smallholder farmers across the region with a valuable cash crop and so help to secure and improve rural livelihoods. This is still a strong market for Eucalyptus clones in view of the large numbers of resource-poor rural communities. Improved trees generate additional income for smallholders and supplement income from existing farming systems. Some are now replacing other crops such as coffee and pasture with trees.

The programme also demonstrated the business opportunities that exist for local entrepreneurs along the value chain. Many local nurseries now supply

and distribute planting materials to small, medium and larger scale farmers and to larger commercial enterprises. Others are developing businesses to supply fuel-wood, charcoal and construction materials especially to schools.

Increasingly, it is the commercial sector where interest in planting clonal material is growing. Medium-scale entrepreneurs, who usually make their living in the towns and cities are looking to establish forest plantations to grow timber as construction materials to generate additional cash income. Larger commercial corporate enterprises that grow plantation crops are looking to secure their timber requirements that are essential to support their main business interests. These include tea, cement and tobacco producers who need fuel-wood for their industrial process as well as an ecologically sustainable base for the supply of packing materials. Local pulp and paper companies located in western Kenya are also concerned to secure their long-term sustainability using cheap, renewable wood supplies.

There are significant investment opportunities to provide credit products to enable entrepreneurs to establish additional nursery businesses and to enable tree growers, smallholder farmers and commercial forest growers to plant more tree crops.

Benefiting the environment

As well as improving livelihoods of the tree growers, this programme also contributes towards improving the environment through carbon sequestration and catchment conservation. Indeed, the implementation of the TBP is in line with the current global effort of Reducing Emissions from Degradation and Deforestation (REDD). However, there are some who see Eucalyptus as a problem rather than as a solution. Nevertheless, it is clearly one of the most efficient tree species for producing energy biomass per hectare of land and per cubic meter of water used. So provided trees are grown in places where the natural resources are most appropriate, Eucalyptus can produce a wide range of financial and eco-system benefits.

Fertilizer Markets Improve Smallholder Livelihoods in Uganda

Enhancing access for farmers to quality inputs

Increasing fertilizer use in Uganda is crucial to sustainably increasing the country's agricultural productivity of staple food crops. Uganda's soil fertility is declining, yields are very poor yet smallholder farmers seem unaware of the benefits of applying chemical fertilizers. They cannot produce enough organic matter and chemical fertilizers are seen as too expensive and well beyond their reach. In Kenya, the average fertilizer application on arable land is 37kg/ha, for sub-Saharan Africa it is 9 kg/ha, yet in Uganda it is less than 1 kg/ha – one of the lowest in the world. Substantial increases in production are clearly possible if fertilizers are made available and farmers learn how to use them properly.

Getting farmers to apply more fertilizer is just one aspect of increasing fertilizer use. Manufacturers, suppliers and distributors are needed to make fertilizers available. Farmers need credit to buy it and knowledge of how to use it for the best results according to their soils, climate and cropping calendar. Infrastructure and markets will become essential to cope with the additional crop production.

A 3-year project was conceived with a dual strategy – to stimulate fertilizer demand by increasing awareness of the benefits among smallholder farmers while at the same time improving the availability of fertilizers through private sector partnerships to meet the potential increase in demand. This substantial project was implemented by AT Uganda Ltd – a well established rural fertilizer/farm inputs retail network – to make fertilizer and other inputs commercially available in selected districts in Western (Kanungu & Kasese districts) and Eastern Uganda (Mbale, Sironko, Manafwa & Busia districts) in packages that are affordable to smallholders. Over 30,000 smallholders in six districts were involved as well as collaboration from 38 public sector stakeholders and 118 private sector businesses (suppliers, distributors, and rural retailers).

In 2007, Kilimo Trust invested US\$440,000 in this project which included US\$240,000 in loans which were used to leverage further private sector investment of US\$1,136,000 and procure some 1,400MT of fertilizer for sale and distribution.

The demand for fertilizer was stimulated by increasing farmer awareness and changing

perceptions about the benefits of fertilizers, namely that using them together with improved seeds and best management practices (including water management) can significantly improve crop productivity and profitability. By 2010, the project had reached over 16,000 farmers, fertilizer use per household had more than doubled since 2008 from 25kg/household to 52kg/household, and some 65% were achieving an additional US\$450 gross income per hectare. Repackaging fertilizer into 2, 5 and 10 kg bags for ease of handling and affordability among smallholders has been a key aspect of enabling accessibility.

On the supply side, small retailers reported increased income with average annual fertilizer sales increasing from 0.35 to 3MT. The total sales value for 24 participating retailers in the first year alone was over US\$58,000. By the third year total annual sales worth over US\$900,000 were recorded.

Stockists have benefited from training in business management, branding and increased sales. More traders were prompted to start selling fertilizers due to increased demand and 35 new businesses emerged.

The project results confirm that increasing fertilizer use as an input into a carefully managed cropping system can improve livelihoods when smallholder farmers are provided with more effective extension support and have timely access to commercially available fertilizer products.

It has worked well and could be duplicated in other parts of the region. It also confirms that strong Public-Private Partnerships make development outputs more achievable.

However, three key challenges remain – the availability of water for production which is essential for efficient fertilizer use, organised output value chains to encourage good and reliable prices for agricultural produce and business credit for retailers to stock and make fertilizers available and for farmers to invest with confidence in fertilizer and other on-farm technologies. The project has demonstrated that these challenges can be overcome with a strong value chain focus that provides benefits to all players, particularly smallholder farmers.

Future business opportunities include up-scaling re-packaged fertiliser, distribution to organised farmer groups and those with contracts to supply buyers, contract farming for farmer groups with increased production and establishing warehouses for storage and primary agro-processing, especially for farmers growing cereals.

*Fertilizer Distribution and Promotion project –
Appropriate Technology (AT) Uganda*

Conservation Agriculture in Kenya

Providing a way out of poverty

Smallholder farmers in Western Kenya, trapped in a vicious cycle of poverty and land degradation are finding that, Conservation Agriculture is an affordable and appropriate technology that holds the key not only to sustained food security but also to improved soils among other ecosystem services.

Intensive tillage and poor agronomic practices degrade the soil, deplete nutrients and reduce crop yields – all of which impact on smallholder farmer livelihoods, hunger and poverty. Conservation agriculture (CA) is a widely accepted method of farming which offers one of the best approaches to slowing and resolving these problems. In essence, it relies on minimal soil tillage (known as conservation tillage) and permanently covering the soil with crops and/or crop residues to conserve soil and water. It uses crop rotations that financially benefit the farmer as well as being good for sustaining the soil and the local ecosystem. CA is not a 'one-size-fits-all' system rather the challenge is to adapt this set of principles for smallholder farmers taking account of local circumstances such as climate, soils and cropping system.

Based on these potential benefits, Kilimo Trust supported a 3-year project to bring the benefits of CA to 4,500 smallholder farmers in Western Kenya. Various field trials identified two promising cropping systems – a maize-soybean crop rotation and a maize-desmodium intercrop. Although both were designed to control Striga, a major weed pest in the region, smallholders preferred the maize-soybean rotation rather than the non-food desmodium crop. Soybean is a legume which fixes nitrogen in the soil and farmers saw the benefit of this when less start-up fertilizer was needed for the maize crop. They also were able to see that the conservation tillage reduced water runoff and soil erosion when compared to conventional cropping practices.

Of the 4,500 smallholders who participated in the field days and visits to the long term CA trials, about 2,700 adopted the new practices on small 0.2 ha plots totalling about 400 ha. Maize yields doubled from

1.5 MT/ha to 3.0 MT/ha using the new practices and soybean averaged 1.1 MT/ha to 1.8 MT/ha. Net household annual incomes rose from US\$53 to US\$146 when the reduction in labour cost was taken into account.

Additional benefits from the project included the establishment of new start-up businesses. Four local artisans now manufacture and sell a specially designed hoe, based on the 'Chaka' hoe used in Zambia. Smallholders rely on the tool to dig planting pits up to 20 cms deep that break through the soil's hardpan and encourages water to infiltrate into the soil rather than running off the land. One commercial and 10 cottage soybean processing enterprises have also been established.

Wider uptake of CA is anticipated because of the interest and involvement of the Kenya Agricultural Research Institute (KARI), local government and farmers themselves. However, farmers still face a number of challenges on-farm such as the lack of appropriate implements at affordable prices. Weed management is also a problem. Large-scale adoption of CA practices requires a functioning input supply chain and support for equipment sourcing, training, repair and service support at village level.

The project has received a grant from the European Union to continue the trials and data collection and to expand CA activities Africa wide including the development of a database and website to document CA successes. The next steps need to link CA adopters with markets and financial institutions in order to secure the value chain for input supply and product marketing.

Promoting Conservation Agriculture to Improve Land Productivity and Profitability among Smallholder Farmers – CIAT

Controlling Banana Bacterial Wilt in Uganda

By overcoming banana bacterial wilt, smallholders increase banana productivity

Between 2005 and 2008, Kilimo Trust built on the work of a number of other organizations and provided a grant to help further contain and control Banana Bacterial Wilt in Uganda. By disseminating information and empowering national and local governments and communities to apply the tried and tested technologies, over 90% of the country's banana crop, involving over 80% of growers, is now protected. In 2007 this raised national banana production from an estimated US\$290 million (without BBW control) to US\$560 million with full control. Uganda is the first country in the region to report and tackle this disease. This control programme is now ready to roll out in other countries where BBW has been reported such as; Tanzania, Kenya, Rwanda, Burundi and Democratic Republic of Congo.

Bananas provide one of the staple foods for over 12 million smallholder households in Uganda. They can be harvested all year round and so it provides a hedge against famine and hunger that other crops cannot match. Ugandan smallholder farmers eat over 200kg/capita annually and are among the world's highest consumers of bananas. It is estimated that 75% of Ugandan smallholder farmers grow 1.5 million ha of bananas which occupy about 40% of the available arable land.

In 2001, banana bacterial wilt (BBW) – a disease which spreads rapidly and can wipe out an entire crop – was reported in Mukono District. This spread throughout the country and even threatens banana production across East Africa. Urgent action was needed to control this disease to prevent famine and protect smallholder livelihoods.

Between 2003 and 2004, BBW spread from 10 to over 250 sub-counties. This is a bacterial disease that causes plants to wilt. It first attacks the flowers and the leaves, discolours the fruit which ripens prematurely and spreads rapidly from plant to plant and from farm to farm if left unchecked. The disease can be controlled using good hygiene measures in much the same way as bacterial infections are controlled in humans and animals. This involves cleaning all tools to avoid spreading the infection; breaking off male buds from flowered plants as soon as bunches emerge and clearing out and burning all infected plants.

Several organisations including Gatsby Charitable Foundation (UK), Rockefeller Foundation, DANIDA and FAO, have supported the uptake of these disease control measures through mass media campaigns and farmer field schools. Although this effort to show how BBW could be controlled reached over 85% of banana growers in Uganda, only about 30% of farmers took up the practices.

Between 2005 and 2008, Kilimo Trust built on this foundation and invested US\$614,000 to further bring BBW under control. The main objective was to contain and control the disease by disseminating information and empowering national and local governments as well as communities to apply the tried and tested technologies. Uganda's National Agricultural Research Organisation (NARO) constituted a multi-stakeholder taskforce to formulate a comprehensive research and development strategy and action plan to contain BBW and to oversee and guide its implementation. They involved all levels of local government (district, sub-county, parish and village) in the taskforce which included political leaders, cultural and religious leaders, public and private extension staff, NGOs and CBOs. This was a significant departure from tradition which usually placed the responsibility of disease-control only in the hands of agricultural extension department staff and farmers.

Epidemiological information was produced and packaged into control recommendations and disseminated using various media and banana growers were actively engaged in implementing BBW control plans.

Using this participatory approach, Kilimo Trust support succeeded in bringing over 80% of farmers into the control programme between 2006 and 2008. In endemic areas, the infected land area was reduced from 78% to 45% and in frontline areas from 55% to 28%. About 75% of the lost banana production (bunches/hectare) was recovered in the main banana growing areas.

Uganda's banana production in 2002, prior to BBW, was estimated to be worth US\$600 million. If action had not been taken to curb BBW it was projected that by 2007, the crop production would only be worth US\$290 million. Due to the interventions, production in 2007 reached 9.1 million tons and was worth US\$560. Production has been steadily increasing since.

In addition to the benefits that farmers, traders and consumers gained from the project, it also strengthened the capacity within the extension and research services. Extension and NGO staff have gained invaluable experience of tackling BBW. Researchers from NARO, universities and CGIARs

are now better equipped to deal with practical problem solving on-farms and local leaders have learned how to mobilize farming communities to improve livelihoods. It is anticipated that this experience with BBW control will be most useful in dealing with other persistent and invasive crop diseases.

Uganda was the first country in the region to report and tackle this disease. Now BBW has been reported in other countries and the Ugandan experience is being replicated to support control measures in Tanzania, Kenya, Rwanda, Burundi and the Democratic Republic of Congo. Although data on BBW control in the region is not available there have been unofficial reports of effective control being established in the Kagera region of Tanzania, Northern Rwanda and Western Kenya.

Given the threat of further spread to other countries in the region, Kilimo Trust facilitated a team of Ugandan Scientists to attend an International Bacterial Wilt Symposium in 2006 in UK's Central Science Laboratory. The symposium focused on refining the road map for control while allowing knowledge sharing and lesson learning. Among the numerous papers presented were two, co-authored by the Ugandan team.

NARO Multi stakeholder Taskforce on BBW

¹ The details of the proceedings of this conference can be obtained from *The 4th International Bacterial Wilt Symposium, The Lakeside Conference Centre, Central Science Laboratory, York, UK, 17th-20th July, 2006: Programme and abstracts book 2006 pp. 106 pp*

Growing Upland Rice in Uganda

A new way of life in Namutumba

Although Namutumba is a traditional grain basket in Uganda, it is a district known to have one of the highest levels of poverty in the country. Farmers grow maize and low-land flooded rice varieties. A combination of uncertain rains, declining wetlands and diseases, such as Bilharzia (which is associated with people spending long periods in wet conditions), poor farming practices and an absence of organized marketing were entrenching poverty in the area. Change was needed.

Africa 2000 Network, a local NGO, believed that changing cropping to the African upland rice variety NERICA III would not only lift the quality of life for people in the area but it would also relieve pressure on wetlands. With US\$120,000 financial support over three years from Kilimo Trust and administered by FARM Africa's Maendeleo Agricultural Technology Fund (MATF), Africa 2000 Network sought to promote the commercial production and marketing of NERICA III upland rice in Namutumba.

The project which began in 2007, achieved its target of reaching over 3,000 farmers and organizing them into 103 farmer groups so that they could engage in collective marketing and by-pass middlemen. One of the main impediments to farmers' progress is small product volumes hence grouping farmers and their crops provides a critical mass which attracts buyers and results in better prices. So far 12 collection centres have been established with over 2,800 members. These centres reduce transport costs as trucks do not have to wait around to load produce. Farmers have also established marketing committees and developed Participatory Market Research (PMR) skills to source and use market information in order to obtain better prices for their produce.

The farmer groups also set up their own credit products for their members by organizing themselves into savings groups to save and lend money amongst themselves. This was crucial because the planned credit facilities from the Banks did not materialize as expected. Their rules, which focus more on the track record of potential

borrowers rather than their prospects, did not fit well with the project requirements. To date this information needs to be confirmed.

Africa 2000 Network provided training, inputs such as seeds, fertilizers and herbicides on credit and support for marketing. They also supplied tarpaulins on credit to keep the crop clean during drying. Some 50 local community facilitators were also trained in upland rice agronomy so they could continue to offer extension advice.

Producing good rice yields on the farms is important but so too is the value chain both for inputs and outputs. Strategic partnerships were arranged to provide extension services and link farmers to suppliers, such as FICA, an agro-seed supplier and produce buyers, such as Afrokai Ltd which already bought sorghum in the area. Market opportunities were further diversified by recruiting Upland Rice Millers, a company based in Jinja, which has the latest rice milling technology. These offered farmers an option to brand and package their produce for the market. The local District Government Administration was also instrumental in mobilizing and engaging the local community to adopt the new technology.

Farmers have faced and overcome many challenges including; pests such as rats and birds, water shortages, and product marketing issues. Striga weed was also a problem particularly on lands with poor fertility such as those in Namutumba. Although it should be possible to grow three crops of upland rice annually in this part of Uganda, the

unpredictable nature of the rainfall has so far meant that, farmers have not yet been able to achieve this full potential. In spite of these difficulties, farmers have found that upland rice has improved their livelihoods. Although climate conditions at the beginning of the project were harsh and yields were low (less than 2 MT/ha) grain shortages led to much increased prices – about US\$700/MT rather than the more usual US\$200/MT.

One of the major achievements is the popularization of upland rice with over 90% of farmers shifting to upland rice. This has relieved pressure on local wetlands. Nearly 1,800MT of rice worth £800,000 was harvested over the project period. There are also wider economic benefits to the community as the sales of farm inputs have increased and business off the farm such as rice milling has grown.

The potential returns to the community from this

3-year investment are significant. If 1,500 farmers grow 0.5 ha of rice and yield an achievable 3 MT/ha with two crops a year. This translates into a total of 4,500MT/year with total sales revenue of over US\$1.8 million/year. If only half of this reaches the market, it represents huge opportunities for input providers (credit, seeds, herbicides, fertilizers and planters and tarpaulins) and other service providers for information and financial services, traders, millers and transporters.

As a result of income generated from rice, some members have diversified their livelihood options by starting income generating ventures such as local restaurants, small grocery shops and bodaboda (motorcycle and bicycle) transport as supplementary businesses.

Promotion of Nerica Upland Rice, Production and Marketing in Namutumba district Uganda – Africa 2000 Network/MATF

Upland rice improves farmers' incomes in Luweero

Three years after the introduction of the improved NARIC III rice variety, farmers in Luweero District have few regrets about switching from swamplands to the dry uplands. With grant assistance from Kilimo Trust to a local NGO -Volunteer Efforts for Development Concerns (VEDCO), through the Maendeleo Agricultural Technology Fund (MATF) - farmers increased production from 1,600kg/ha using local varieties to 2,800kg/ha of milled rice by growing NARIC III rice. Farm incomes also rose because the project provided market information and helped farmers to set up collective marketing which enabled them to negotiate better prices with buyers. Yields per hectare also translated into higher incomes per hectare.

There is a high demand for rice in Uganda and in a bid to promote home grown rice, an import duty of 75% was stamped on imported rice. Most farmers grow traditional low yielding rice varieties in swamplands. But as the demand for rice increased rice growing began to impact the swamps negatively causing severe damage to local ecosystems on which people, agriculture and the environment depend. New upland rice varieties offered a viable alternative to farmers to grow more rice and as a consequence it offered protection for wetlands and wildlife – a 'win-win' situation. NARIC III rice is a new breed of upland rice in the African market. It is fast growing, more resistant to pests and diseases and highly productive. It matures in 105 days and yields 3,000 kg/ha-3,600 kg/ha. Other breeds take 120-145 days and yield 1,900-2,800 kgs/ha. It also tillers freely and can grow on any type of soil apart from water-logged or chalky soils.

This project began in 2005 to encourage farmers to grow NARIC III upland rice and to organize marketing of among 20 farmers' groups in 5 sub-counties in the central Uganda District of Luweero. Production and marketing constraints were addressed these were related to a lack of capital, poor crop management practices and limited access to markets. The initial success of the project was attributed to farmers working in groups. By 2007, 615 farmers organized in 20 groups had adopted the technology, of which 242 (39%) were women. Through this approach, farmers were mobilized to become active participants in the marketing process. Cooperatives were formed as collective

production and marketing centres. By providing market information, some groups developed a culture of holding their produce, especially in the first month after harvest, in order to take advantage of higher prices.

Three of the cooperatives acquired rice mills through individual member contributions. In addition, they established packaging processes and marketed the rice under the brand name "Lu-Rice", meaning Luweero Rice. The Alinyikira Cooperative Group, which has a combined rice area of 10ha, harvested and sold 20MT of rice in one season. Members shared 90% of the profits and the balance was saved on their bank account. By the end of the project, the Cooperative had initiated the process of registering "Lu-Rice" with the Uganda National Bureau of Standards for Certification. They were optimistic and look forward to a situation where members could increase their productivity using irrigation and reduce their dependence on rainfall.

Critical to the success of the project was the micro-credit component which enabled farmers to buy farm inputs such as seeds, herbicides, spray pumps, tarpaulins and rice hullers by raising 30-50% of the cost. Some groups devised saving systems and lent money to members but the biggest challenge however was recovering these loans.

The project ensured that there was equitable role distribution, access and control over land, participatory decision making at households and participation of women in agro-marketing as part of the intervention strategy.

But what about the swamplands? They are a crucial part of Luweero District heritage. They provide the 'green infrastructure' that maintains and sustains local water supplies for people, agriculture and the environment. Indiscriminate rice farming upset that balance as farmers found the swamplands attractive for rice growing. Fearing erratic rainfall patterns, many took advantage of the low-lands to grow rice for subsistence purposes which severely compromised the ecological balance. Fortunately, upland rice growing is re-dressing this balance and is aiding the recovery of the wetlands for the benefit of everyone.

Project: Promoting Upland Rice in Luweero District, Uganda

'Rice Advice' Videos in Local languages

Innovative approach to agricultural extension for smallholder farmers

These videos were produced as a tool for extension workers to be able to effectively communicate with small holder farmers on how to successfully grow and handle upland rice.

Rice yields on smallholdings in Eastern and Southern Africa (ESA) are only 1-2 MT/ha, about 20-30% of what is potentially attainable. Currently, ESA imports more than 500,000 MT of rice annually costing more than US\$100 million in foreign exchange. As the demand for rice in the region is growing at 6% per annum, mainly from urban consumers, there is an excellent opportunity for smallholder farmers to meet this demand and improve their livelihoods. They only need to increase productivity by a little as 0.5 MT/ha. An innovative video on farmer-to-farmer rice cultivation will help them to do it.

Smallholder farmers are struggling to improve rice yields. They lack inputs and the knowledge to use them for their advantage so they not only produce low yields but also poor quality rice losing much of what is produced during postharvest. Traditional training through Farmer Field Schools and open days has not reached the majority of farmers who would benefit from improved production practices. Extension services often lack access to good quality training materials.

The work of AfricaRice on participatory learning has shown that the use of farmer-to-farmer videos can stimulate uptake of new and improved practices. The use of audio-visual communication is not widespread in spite of its proven impacts. To improve this situation Kilimo Trust provided a grant of US\$23,000 to AfricaRice and Farmers' Media Paper to produce Rice Advice videos on DVD for use in farmer training. These were produced by Countrywise Communications Ltd.

The videos reflect the participatory learning approach and show how to improve rice growing techniques and improve postharvest technology. They were completed in December 2010 and are to be distributed widely across the region – 10,000 in Uganda and 10,000 in the other East African countries (Burundi, Kenya, Rwanda, and Tanzania). They are available in 8 different languages commonly used across East Africa – Ateso, Luganda, Lugbara, Luo, Runyakitara, Swahili, English and French. Assuming that each video is watched by up to 100 farmers, the project hopes to reach over 2 million farmers.

This innovative approach at relatively low cost should attract extensive publicity and could provide a new model for agricultural extension. Smallholder farmers will be able to discuss and apply the techniques shown without necessarily investing in new technology. The uptake of techniques should lead to 20-40% increase in yields and 15-20% increase in incomes thus contributing to improved household food security and a reduced dependence on imported rice.

This is a project implemented over short period but the impact will be felt for a long time.

Africa Rice and Farmers media paper.

Improving vegetable productivity among smallholder farmers

Drip irrigation combined with the use of organic and inorganic fertilizers has enabled smallholder farmers in Nyando and Kisumu Districts of western Kenya to grow new high value commercial crops such as vegetables and bananas. Some 300 smallholders have now changed from traditional subsistence farming to commercially-oriented farming with considerable improvements in their livelihoods. An added benefit has been the availability of clean water from irrigation tanks for domestic use, which has reduced the families' workload searching for clean water sources.

This 2-year project which started in 2005 introduced appropriate technologies for improved agricultural productivity and ensured that farmers had access to credit facilities to help them acquire the relatively expensive technologies. It was implemented by Sustainable Aid in Africa International (SANA) with financial assistance from the Gatsby Charitable Fund through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF). The project helped about 300 smallholder farmers in Nyakach and Manyatta in Kenya, most of whom were widows and widowers who had lost their spouses from the *HIV/AIDS* pandemic. It provided them with appropriate technologies to enable them improve soil fertility and efficiently use scarce water resources for commercial agriculture. Grants provided the opportunity for SANA to continue supporting the target communities to access water for production using drip irrigation, agro-forestry, financial services - including enterprise development through community or village banking.

Farmer Field Schools (FFS) approach was used to create a valuable forum for transferring promising technologies. A total of 27 trainers were trained so that they in turn could train other farmers including youths in schools. The technologies promoted were the use of drip irrigation (bucket and drum kits) and methods to improve soil fertility using both organic and inorganic fertilizers for production of horticultural crops. Most farmers as a result engaged in production of kale, crotalaria, spider plant, onions and tomatoes

Value-adding processing technologies were also introduced and these contributed to improved market access and increases in income through sales of farm products such as; peanut butter and sweet potato products like cakes, chapatti (pancakes) and mandazi (donuts). To ensure continuity, a total of 323 farmers were trained in business development and marketing to make sure they acquired these key skills.

The introduction of drip kit technology has not only improved farm productivity but also provided families with access to clean water from the water tanks constructed for the irrigation system. .

In view of the relatively high cost of the water tanks and other technologies such as value adding processing technologies and farm inputs, a key component of the project's success was the micro-credit facility. This was successfully managed through Village Banks, managed mainly by women and provided a US\$25,000 (Ksh2.2 million) revolving loan fund. The repayment period was six months for buying farm inputs, and 18 months for water tanks. Both attracted an 18% interest rate. During the first phase of the project, tank loan beneficiaries (for a 20m³ water tank) contributed a minimum of US\$160 (Kshs 14,000) – 30% of the cost in order to qualify for a loan to cover remaining costs. The beneficiaries later had to meet the entire tank costs. Farmers were advanced 3 times their savings which financed the construction of water tanks and other farm inputs like, seeds and inorganic fertilizers. Since farmers had a stake in the scheme, it enhanced the sense of ownership and responsibility.

Some 126 farmers procured farm inputs and 31 farmers purchased water tanks. The average recovery rate was maintained at 90% for farm inputs and 72% for tank purchases.

Value adding processing technologies were also introduced and these contributed to improved market access and incomes through sale of processed farm products. Marketing committees were set up to enhance marketing as well as reach more farmers. The Village Banks acted as the Apex Marketing Center though additional capacity building was required for optimal operation. Linking marketing with Village Banks assisted in smoothing loan repayments.

Despite the successes, the project experienced several challenges. The cost of water tank materials increased significantly, leading to a revision in loan terms with part of the savings from tank beneficiaries being

ploughed into implementation instead of being set aside as collateral. Also owing to high poverty levels, there was generally a slow pace in individual savings at the Village Bank hence the delay in loan disbursement for both tanks and farm inputs. This in turn slowed down technology uptake. Lastly, the increased yields were only seasonal because during the dry season, the water supply was not adequate due to the competition between domestic requirements and on-farm production.

All in all, the Project showed great potential and contributed to MATFs goal of improving livelihoods through increased production and commercialization of agriculture.

Promotion of efficient use of water for improved on-farm production to small scale farmers in Nyakach (Nyando) and Manyatta (Kisumu) in western Kenya- Sustainable Aid in Africa International (SANA)

Keeping weevils at bay with metal silos

Weevils, such as the large grain borer, have been singled out as the main cause of post-harvest grain losses in Eastern Kenya. It is common for entire harvests to be wiped out during severe infestations. Traditional forms of grain storage offer little protection, but thanks to the metal storage silos, farmers are now able to safeguard their grains and guarantee food security for their homesteads. There is no need for chemical treatment of the grain. The metal silos preserve grains for up to five years. Besides guaranteeing full protection against destructive pests, metal silos are improving food security for smallholders. The silos have a useful life of over 50 years with minimal maintenance costs.

Poor crop storage facilities, including sub-standard storage pesticides, contribute to crop losses. Traditional cribs and gunny bags, the most common storage facilities, do not offer much protection against insect pests. Pests in stores are also linked to aflatoxin poisoning which affected some parts of eastern Kenya in 2004 and 2005.

A new technology which is proving to be effective in protecting harvested grains from attack is metal silos. They are constructed to provide airtight storage which minimizes oxygen levels in the store and kills any weevils or pests that may be inside. It also locks out any insect or pest that may try to invade the stored grain. Metal silos come in different sizes. The smallest stores 1 bag (90 kg) grains while others store 3, 6, or 20 bags. The silo cost varies from US\$59 (Ksh4,000) for a 1-bag store to US\$190 (Ksh18,000) for a 20-bag store. Trained metal artisans can easily fabricate these cylindrical grain storage structures.

Aware of its potential, the Catholic Relief Services (CRS) initiated the Metal Silo Promotion Project in July 2005. The project's main objective was to reduce post-harvest on-farm grain storage losses in Machakos, Kitui, Mwingi, Kirinyaga and Murang'a districts. It was implemented by the Catholic Dioceses of Machakos, Murang'a and Kitui in collaboration with the Ministry of Agriculture and Kenya Agricultural Research Institute. It is co-funded by FARM-Africa's Maendeleo Agricultural Technology Fund (MATF) with funds from Kilimo Trust and CRS private funds.

Training and participatory evaluations and demonstrations were used to sensitize communities about the effectiveness of the metal silos. Artisans were trained to fabricate, use, and maintain them so that the silos could be locally manufactured. This was complemented with entrepreneur/business skills development training so that artisans could

both fabricate and sell silos as a business venture.

CRS set up a revolving fund to enable farmers to buy the silos. This was designed so that a farmer raises only 40% as a down payment to qualify for a 60% loan. The loan was then advanced to an artisan to cover the cost of fabrication, the balance being met by the farmer on completion of the silo.

To support dissemination of this technology, MATF facilitated CRS to participate in the 2007 Nairobi International Trade Fair. A representative of CRS was on hand to explain and demonstrate the technology to keen show visitors, many of them practicing farmers from districts around Nairobi. Besides farmers, the project also targeted boarding schools which buy grains in bulk and therefore potential customers for this technology.

While the metal silo is a simple and effective grain storage technology, there are some challenges that required both innovation and creativity if farmers are to benefit from it. One of the biggest challenges was the initial high capital cost. However, considering that the silos can be used for over 50 years, with minimal maintenance costs, they are much cheaper than the conventional storage technologies which can cost between US\$3 (Ksh200) and US\$35 (Ksh3,000) per season. The silos can also protect the grain in storage for much more than the four months used by conventional storage systems.

It is clear that the metal silo technology is feasible and effective but farmers report that the initial cost of silos are high. To speed up adoption, it will be important to maintain the credit facilities from the revolving funds and to target farmer groups and grain storage enterprises as well as individual farmers.

Promoting Metal Silos- Catholic Relief Services

Mango Processing in Kenya

Improving smallholder livelihoods along Kenya's coast

Mangoes are the main fruit grown along the Kenyan coast, but they are usually sold fresh which creates a glut during the harvesting seasons and this depresses market prices. Adding value by drying mango chips and pickling would extend their shelf-life and offer opportunities for smallholder farmers to improve their income and create employment. To enable them to take advantage of this situation a project was established to disseminate production and marketing technologies that would develop mango growing into a sustainable business enterprise with national and international marketing potential.

In 2006, the Kenya Agricultural Research Institute, Mtwapa implemented a project to help 800 farmers, organized in 20 farmer groups to increase mango production by adopting good agricultural practices and enabling them to process and preserve mangoes to produce various products for the market. To achieve economies of scale, the 20 groups merged to form one umbrella group, the Kilifi and Malindi Agricultural Products (KIMAP), which was certified by Kenya Bureau of Standards (KEBS) to allow it to process and sell mango products throughout the country.

The project received financial support from Kilimo Trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF).

The key partners in this 2-year project included Kenya Agricultural Research Institute (KARI Mtwapa), Ministry of Agriculture (MoA), Kenya Gatsby Trust (KGT), Kenya Industrial Research Development Institute (KIRDI), Kenya Bureau of Standards (KEBS) and K-Rep Development Agency (KDA). KARI Mtwapa and its lead partner, Technical Advisory and Management centre (TAMC), facilitated access to production and marketing technologies, correct application of agro-chemicals as well as appropriate post-harvest handling and processing technologies for mangoes.

Existing farmer groups were targeted and five superior mango varieties - *Kent, Tommy, Atkins, Van dyke, and Haden* - were introduced. Farmers were trained in good agricultural practices, nursery management, grafting techniques and value adding technologies including solar drying and product development.

Demonstration sites were set up at KARI stations - Mtwapa in Kilifi and Msabaha in Malindi - which also acted as 'mother blocks' to provide scions of popular and commercial mango varieties. On-farm demonstration sites were also established - one in each District (Kilifi and Malindi) - to demonstrate good agricultural practices and provide nurseries for improved mango varieties. Private sector involvement was encouraged to capture the potential export markets from increased mango production.

In the first two years, it was clear that mango production and farmers' livelihoods could be significantly improved. By 2007, 14 groups had established their own nurseries and were propagating superior exotic varieties. In addition, 14 artisans were trained to build mango solar driers but this technology is yet to take root. By early 2008, several of the groups were processing mangoes into chips, jam, juice, pickles and chutney although some farmers still preferred to divert fresh produce into local markets.

By December 2007, a further 5 farmer groups had been formed and others were showing interest. In total, this involved about 800 farmers who were able to access credit for scaling up their production and value adding technologies.

High value markets were identified in order to avoid over supply and subsequent falling of prices and farmers were supported to identify buyers and negotiate prices. They were also introduced to contract farming which would guarantee a market for mango products and protect them against price fluctuations especially during a surplus. Farmers were also sensitized on the importance of quality and hygiene requirements for local and international markets.

Buyers wanted large volumes and guaranteed deliveries so the 20 farmer groups merged into one umbrella group– the Kilifi and Malindi Agricultural Products (KIMAP) to pool their products and reap the economies of scale. KIMAP was certified by Kenya Bureau of Standards to allow it process and sell mango products throughout the country.

By close of project, KARI had expanded the project to all Coastal districts, Eastern and Central Provinces of Kenya. KARI plans to continue working with farmers for another two years as they adopt this new value chain concept.

Empowering smallholder farmers in Kilifi and Malindi districts through improved mango production techniques, marketing and information dissemination, Kenya - Kenya Agricultural Research Institute (KARI-Mtwapa).

Thermo-stable Newcastle Disease Vaccine in Tanzania

Increasing rural chicken productivity

Newcastle disease can cause devastating losses among village chicken in Tanzania. The development of thermo-stable vaccines, which are more robust and can be transported for hours without refrigeration is proving invaluable for controlling the disease in rural areas. A 2-year project, which made this vaccine available to almost 6,000 smallholder farmers in Mwanza Tanzania, reduced chicken mortality by 80% and substantially increased farm incomes and improved family nutrition.

Normally Newcastle disease vaccine deteriorates when stored for a few hours at room temperature. This makes it unsuitable for use in rural areas where vaccines may need to be transported for several hours or days without refrigeration. The Thermo-stable vaccine is much more 'user friendly'. It still requires long-term storage in a refrigerator but it does not deteriorate quickly when being transported in the field and it can be stored for up to 30 days at room temperature.

Despite the availability of thermo-stable vaccines in some parts of Tanzania, chicken keepers in Mwanza were hardly aware of it. In order to take advantage of this vaccine, a project was set up in 2005 by the Lake Zone Agricultural Research Development Institute (LZARDI) based in Ukiriguru, Mwanza in three districts (60 villages) – Kwimba, Missungwi and Sengerema. It was funded using a grant from the GCF through FARM Africa's Maendeleo Agricultural Technology Fund, which enabled farmers to access the vaccine from the Veterinary Investigation Center in Mwanza and also from the District Livestock offices (DALDO).

Farmer sensitization, group mobilization and training, were used to disseminate the technology and significant interest was generated in the communities. Demand for the vaccine increased and the project team devised ways to ensure that communities had easy access to the vaccine. They linked community groups with agro-vets in the villages and towns and trained 2-3 farmers in each location to carry out the vaccinations for a small fee. This removed the need to bring in formal vaccinators.

The vaccine was produced at the Central Veterinary Laboratories in Temeke, Dar es Salaam and was transported at normal room temperatures by road to Mwanza, a journey of 2-3 days, usually in the storage compartments of public buses. It was purchased by District Livestock Officers and various stockists at a cost of US\$2.50 (Tsh3,000) per vial of 400 doses and stored in refrigerators at 4-8°C with a shelf life of about 6 months. Farmers then bought the vaccine at US\$2.90 (Tsh3,500) per vial and transported it in small woven baskets to the village where it remained active for 30 days at normal room temperature.

Due to the vaccine's efficacy and user friendliness, it was widely adopted by 5,800 project farmers and some 2,000 farmers outside the project (both men and women) with sales tripling within the 2-year project life. By 2007, the technology was having considerable impact on households and farmers who had increased their flocks due to improved health given by the vaccine. From an initial average of 16 chicken per household, local poultry production increased 5-fold to 74 chicken per household in less than a year. Families enjoyed improved nutrition from the extra chicken as household consumption increased from 1 to 3 chicken per month. Household sales also increased from 2 to 6 chicken per household. Income from chicken sales increased from US\$5 (Tsh6,000) to US\$15 (Tsh18,000) per month (excluding egg sales).

The increased income enabled farmers to invest in other livestock such as dairy goats and draught oxen. For example, 6-7 chicken were traded for a goat and 5 goats exchanged for an oxen. Increased chicken production also meant an increase in informal employment for young people who often served as middlemen between farmers and consumers.

The project built the capacity of farmer organisations by providing training on group organization and management, good leadership, conflict resolution and accountability of leaders. Out of the 58 groups formed, 50 opened accounts with savings ranging from US\$200 to US\$600 to facilitate vaccine purchases and provide short term loans to members.

Profitable links were established between farmers and traders in the local markets in Mwanza, Sengerema and in Kahama and Geita mines. The demand for chicken from the traders was much greater than the available supply and this created a good opportunity for the farmers to increase production.

For the project to have greater impact, farmers will need to move from subsistence to commercial poultry keeping and attract commercial interests by growing much larger flocks, organising group selling

through bulking products and linking to market information sources and traders. While the project has not been able to help farmers to increase flocks from 10 birds to say 100-200 with in its current life increasing bird stocks in the community has been a good indication of technology uptake and it is just a matter of time before the farmers and groups are able to go commercial.

A significant achievement is that, two out of the three target Districts have institutionalized the technology in their long term District Agricultural Plans (DAPs).

Community-based wider dissemination of thermo-stable New Castle Disease vaccine in rural chicken of Mwanza Region, Tanzania - Lake Zone Agricultural Research Development Institute.

Reclaiming Soils in Northern Tanzania

Increasing crop production on arid land

Salt can accumulate on irrigated land in arid regions. It is a common problem and can lead to significant crop losses and in some cases the land is abandoned as unproductive. Some smallholder irrigation schemes in Tanzania suffer from this problem but a recent project has demonstrated that with careful management land can be reclaimed and made productive again. Rice yields on reclaimed land increased from 240kg/ha to 1200kg/ha and maize yields increased from 120kg/ha to 520kg/ha. Average income of rice and maize farmers more than tripled from US\$125/yr to US\$417/yr. Onion farmers also benefited and increased their income up to US\$2,500/yr.

Three villages in northern Tanzania witnessed a boost in crop yields because of an innovative project that reclaimed 168ha of saline unproductive land. Salinity affected 420ha of the 650ha irrigation scheme in Kileo set up by the Tanzanian Government in the 1970s. A further 360ha was affected on the Kivulini Irrigation scheme set up in 2001 to expand rice production. Due to poor management methods, the soils had become saline with disastrous effects on crop yields.

Investigations undertaken in 2002 by the Agricultural Research Institute (ARI-Mlingano), which is based in Tanga demonstrated that, these saline soils could be reclaimed and crop yields significantly increased by adding gypsum (naturally occurring white deposits known as hydrated calcium sulphate) to the soil and combining this with good irrigation practices for improved soil fertility and crop varieties.

In order to put these research results into practice, GCF funded a project through FARM Africa's Maendeleo Agricultural Technology Fund to help 300 farmers in the villages of Kivulini, Kituri and Kileo near Mwangi to reclaim their lands.

In 2004, ARI-Mlingano began mobilising farmers into three associations – the Kivulini Water Use Association, the Kileo Water Use Group and Tumaini Savings and Credit Cooperative (SACCO). Four technologies were promoted in two packages – the application of local Makanya gypsum alone or in combination with kraal manure and improved irrigation and drainage. Fifty farmers were trained

as trainers, together with 4 extension staff and 198 farmers on a wide range of technical and business management skills. These included the causes of salinity, land reclamation and management, improved irrigation techniques, use of improved crop varieties, soil fertility improvement and business improvement techniques through value addition and better marketing. Revolving funds were established as a sustainable source of funding for farmers. Over a 2-year period the fund was used to supply about 1,500 MT of gypsum to the farmers on a loan basis. The farmers paid 60% of the costs to their water users association. This was double the project target and was designed as part of an exit strategy to enable the association to provide loans to their members for acquiring gypsum.

By 2005, the project had successfully reclaimed at least 20% per cent of the salt affected fields. A year later, crop yields on reclaimed fields had significantly increased. By 2007, 300 farmers had taken up the technology with most impact being registered in Kivulini village. The interest and enthusiasm shown by the farmers and the adoption rates were clear indications of the success and impact of the technologies on agricultural production. Another driver for technology uptake was that farmers were able to diversify their cropping and tap into a wider market potential. Another 180 farmers used the experience gained on the project to increase their productivity and profitability on non-project crops.

There are also examples of farmer groups that were not directly involved in the project but who adopted the technologies and approaches. However, many preferred to grow rice over other crops as it produced a good cash income. The farmer institutions have also organized themselves into farmer production networks (MIWATA).

Given this high rate of success, in 2007 Mwanza district adopted a resolution to make reclamation of the salt affected soils a priority in district irrigation schemes. Donor supported programmes, PADEP and ASDP, also provided support to the farmers to help them sustain project interventions.

Impact of Land Reclamation on Crop Yields

Crop	Original yield (bags)	Yields after project intervention (bags)	% increase
Rice	15	45	300
Maize	3	8	260
Capsicum	None	10	New crop
Onion	None	38	New crop
Tomato	9 crates	70 crates	800

Disseminating technologies to reclaiming salt affected soils for increased crop productivity and household incomes, Kileo irrigation scheme, Northern Tanzania - Agricultural Research Institute, Mlingano

Urea Molasses Multi-nutrients Blocks in Tanzania

Improving local milk production in Zanzibar

Urea Molasses Multi-nutrient Blocks (UMMBs) are 'lick' blocks containing molasses, vitamins, and minerals. They are a convenient and affordable means of providing animals with the nutrients they need and which may be deficient in their diet. UMMBs can result in substantial increases in cow milk yield and farm incomes which in turn can improve the livelihoods of smallholder rural farmers. In Uguja and Pemba islands in Zanzibar, this technology increased cow milk yields from 1 to 5 litres/day and farm incomes from US\$0.40 to US\$2.10/cow/day for more than 450 smallholders.

Urea Molasses Multi-nutrient Block (UMMB) technology was first introduced in Zanzibar in 2001 by the Ministry of Agriculture and tested on dairy cows. The initial results showed that UMMBs had potential to double the milk production from 7 litres to 14 litres per cow per day. The target was to scale up this technology to reach as many small milk producers as possible.

The opportunity to do this came in 2006 when with financial support from Kilimo Trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF), Zanzibar's Ministry of Agriculture, Livestock and Environment (MALE) initiated a 2-year project to empower smallholder livestock keepers in Uguja and Pemba islands to adopt UMMB as a feed supplement for their dairy animals. The project not only disseminated UMMB technology but also set out to improve the farmers' knowledge of dairy husbandry management practices. It also aimed at strengthening existing farmer groups at community level in three Districts – Central and West on Unguja Island and Chake-Chake on Pemba Island.

MALE adopted a multi-sectoral and multi-disciplinary approach that brought on board different partners to implement the project. This involved the government of Zanzibar (MANREC) in collaboration with private institutions as well as local village authorities and farmer groups.

In view of the limited agricultural extension services in the project area, one strategy was to train farmers to become trainers of other farmers. This, combined with farmer groups and farmer field schools approaches proved critical in disseminating information and in the uptake of UMMB technology.

Another strategy was to link farmers to raw material supplies. One partner – Farmer Care Mwanakwerekwe, an agricultural stockist based in Zanzibar – was able to consistently supply the raw materials on credit for UMMB manufacture. This partner also helped to link farmers with reliable markets for their milk.

Some farmers were concerned about toxicity and so demonstrations were conducted with a few innovators to convince them that the UMMB were safe for use. This increased farmer confidence in adopting the mineral blocks for their own animals. A revolving fund scheme was also introduced to provide credit when the project wound up.

As a result of this project, 450 farmers (270 project farmers and 180 non-project farmers) adopted the technology because it was affordable and increased milk yields. The technology is environmentally friendly and blocks were easy to manufacture using locally available resources of urea, salt, molasses, crop residues with maize or rice bran. Livestock keepers also found additional benefits as their animals gained weight and fertility rates increased. This project has positively changed farmers' livelihoods through increased earnings, improved health of family members and employment creation at household level.

Use of urea-molasses multi-nutrient Blocks in Zanzibar - Ministry of Agriculture Natural Resources Environment and Co-operatives

Draught Animal Power in Tanzania

Increasing agricultural production

Using Draught Animal Power (DAP) technologies to cultivate land can significantly reduce farm labour by as much as 62-85hrs/ha. In Tanzania, smallholder farmers saved as much as 90% of their farm labour input which enabled them to increase household cropped area from 3ha to 3.4ha and in combination with other farm inputs, to increase their maize yields from 800kg/ha to over 2,900kg/ha. Additionally, farmers used the saved time to pursue off-farm income generating activities such as carpentry and blacksmithing.

This project to improve labour productivity through animal traction weeding and ripping technology was funded by Kilimo Trust through FARM-Africa's Maendeleo Agricultural Technology Fund (MATF) and implemented by the Agricultural Research Institute in Uyole in Njombe and Sumbawanga Districts in Tanzania. It was designed to reduce drudgery and labour through the use of superior Draft Animal Power (DAP) implements and lead to improved farm incomes.

It was clear at the outset that, it would take more than just providing DAP implements to farmers to realize the benefits. For this reason, a good dissemination strategy was developed as a prerequisite. The multi-disciplinary nature of the implementing team ensured that the intervention had a holistic approach – addressing complete packages of inputs. Ox rippers, weeders and inputs were provided through an 'in-kind' revolving credit facility administered by the farmer groups and NGOs.

The project team was aware that, farmers were more likely to accept a technology if they experienced its benefits and had knowledge of how it operates. Farmer Field Schools (FFS) were used to introduce and sensitize the community about the technologies. Farmers were organised in to 16 FFSs, each made up of 16 households. Each FFS provided a one-hectare plot for training and awareness creation. One hundred and twenty four farmers (36 per cent women) were then selected to become farmer trainers. By 2007, the trainers had effectively trained 203 households in 11 neighbouring (non-project) villages. In 2008, a total of 320 households were trained.

To increase awareness and interest among farmers, 1,000 calendars with DAP messages were printed and distributed and 8 weeding competitions (two in each village) were organised at two annual zonal agricultural shows known as nane nane.

In 2006, to assist farmers to acquire expensive equipment, two community-based organisations (CBOs) were formed and registered – in Utimala and Ukuwamambu Districts. In partnership with SEAZ, 210 households were trained in 14 FFS in Chunya and Mbarali Districts thereby spreading the impact way beyond the project area. Between 2007 and 2008, oxen mechanization projects were implemented and employed 16 of the Farmer Field Trainers for 8 months to participate in farmer training at two oxen training centres.

A key to the project's success was the provision of microcredit facilities. Within two years, the two CBOs had loaned up to US\$16,360 (Tsh19.4 million) to 116 households (46% of the participating 252 households). Because of this facility, farmers were able to buy their own DAP implements, which were expected to last 10 years before replacement. Despite the high capital costs of acquiring the implements – about US\$523 (Tsh620,000) – access to DAP implements increased by 22 rippers, 81 weeders and 11 carts. The ox-weeding resulted in a significant labour saving of 62 to 85hrs/ha. This enabled farmers to increase the area under crop production from 2.96 ha to 3.36 ha. Of the 252 project households, about 10% used the project lessons to diversify into off-farm activities such as carpentry and blacksmithing. Another 20% invested the time saved to increase horticultural production, while 60% utilized the time to expand the area under crop production and

improve their management. Maize yields increased from 800kg/ha to 2,935 kg/ha. By December 2007 about 600 households were using the technology and about 750 households by March 2008.

Further support from the Directorate of Irrigation and Technical Services (DITS) and the Ministry of Agriculture enabled farmers to acquire certified maize seeds, fertilizer and training.

Many projects often struggle with the management of micro-credit schemes, but the two CBOs set an example to emulate. By the end of the project, the CBOs had managed to recover US\$5,193 (Tshs 6,158,100) from members – around 60% of the borrowed funds. On average, 90% of the farmers who had borrowed from Utimale were servicing their loans compared to 62% for Ukuwamambu. The lower loan servicing or recovery recorded by Ukuwamambu was due to the fact that, they invested heavily in trading and loaning fertilizers to members. Unfortunately, extra heavy rains experienced that year proved a disaster, making it difficult for farmers to repay their loans having lost much of their crop.

As an indication of viability and sustainability of the project, the two CBOs borrowed about US\$13,000 (Tsh 15.5 million) from SACCOS for the 2007 growing season even after the project wound up in October 2007.

Despite the successes recorded there are still challenges and opportunities for future project interventions. Farmers were pressing for credit for industrial fertilizers amidst the huge resources of untapped farmyard manure and legumes. They therefore, needed to be trained on appropriate compost preparation and manure handling techniques.

Improving labour productivity through animal traction weeding and ripping technology, in Njombe and Sumbawanga Districts in Tanzania - Agricultural Research Institute (ARI), Uyole.

E: Thought Leadership on Supportive Policies and Strategies at Regional Level

Regionalizing Food Security in the EAC

Influencing national and regional policies to expand collaboration

To be effective, policies need to be robust and evidence-based. However, data covering all aspects involved in policy initiatives are seldom available to policy-makers. Indeed, all East African Community (EAC) Partner States have policies that deal with agricultural development, food security and nutrition but, these have a number of weaknesses which constrain implementation.

Embedded within the establishment of the EAC is an agenda to reduce poverty and generally improve people's welfare. Indeed, the EAC's Agricultural and Rural Development policy recognizes the importance of eliminating hunger and ensuring sustainable food security within the region as a necessary first step to poverty eradication. This is to be achieved through stimulating rational agricultural development, increasing agricultural production, processing, storage and marketing.

Kilimo Trust recognizes that, gaps exist in ensuring adequate policy support as well as the necessary strategic investment by the public sector. To help fill these gaps, the Trust identified and financed a number of short-term "thought leadership" studies to help generate the evidence and knowledge necessary to guide policy dialogue and formulation and strategic planning at international, regional and local levels. These studies focus on two main value chains. First is the knowledge value chain which looks at moving agricultural knowledge from research into practice. Second are the agricultural value chains which effectively link small and medium size producers to markets and consumers.

Feasibility of a Common Strategy for Food Security in the EAC

Kilimo Trust supported the EAC to commission a study to assess and understand the capacity of the Member States to meet food security objectives which would act as a guide for implementing a regional food security plan.

The study produced a long-range blueprint for enhancing food security and deepening the

economic benefits accruing to producers and others involved in the supply of food staples in the EAC. It recommended that, food security could be achieved through a regional approach driven by trade and production systems that exploit comparative advantages of the different agro-ecologies in the region. The study also highlighted the need for accelerated development of regional value chains in staple food products supported by agri-business, agro-industries and adequate 'last mile' infrastructure.

Kilimo Trust facilitated a 2-day round-table meeting (co-financed by the Association of European Parliamentarians with Africa - AWEPA) that brought together food security experts and relevant policy-makers to discuss the study findings. The recommended policy framework was discussed and adopted by the EALA during their meeting in Kampala in 2010.

The study also contributed to the EAC stated objective of ensuring food security for the region and was used in the preparation of the EAC's common strategy to address food security. Kilimo Trust supported the organization of the EAC Summit on Food Security and Adaptation to Climate Change. Drafts of the food security strategy were prepared by Kilimo Trust and presented by the Kilimo Trust Management, ratified by the East African Legislative Assembly and later adopted at the special Heads of State Retreat on Food Security and Climate Change in December 2010. The CEO of Kilimo Trust was the main speaker on food security at this special summit.

The outcome of this is the Food Security Action Plan approved by the 9th Extraordinary Summit of the EAC Heads of State.

Agro-industries and 'last mile infrastructure' needs for enhancing EAC regional trade-based food security

It is a well-known fact that inadequate infrastructure in general and in particular 'last mile' infrastructure is one of the greatest constraints to growth in agricultural production in sub-Saharan Africa. 'Last mile' market-oriented infrastructure is critical to the success of rural development and poverty eradication. It is particularly important as the link between production and input-output markets as it can substantially reduce the risk of investment in agricultural development including agricultural loans. While the problem is well recognized, investment in rural or 'last mile' infrastructure remains small.

Infrastructure development is identified as a pillar of economic development under the New Partnership for Africa's Development (NEPAD) and the Comprehensive Africa Agriculture Development Programme (CAADP). Development partners such as the African Development Bank have renewed their interest in financing infrastructure and agro-industrial development. Unfortunately, this momentum is easily lost unless potential investors and financial institutions are confident that, past mistakes in infrastructural investment are now understood and can be avoided in the future.

To evaluate gaps in the policies and strategies for infrastructure that support regional value chains for staple food products in sub-Saharan Africa, Kilimo Trust co-financed a study with the Food and Agriculture Organization of the United Nations (FAO). This provided a number of background papers together with four sector-specific background papers dedicated to marketing, storage structures, rural roads and irrigation. In 2009, these papers served as primers for discussion at a high level roundtable meeting organised by Kilimo Trust and attended by 39 delegates from over 10 countries. The meeting provided a platform for regional experts and practitioners to discuss and make recommendations on strategies and good practices for maximising benefits and ensuring sustainability for investments in market-oriented agricultural infrastructure.

The meeting identified the roles and comparative

advantages of development partners such as the AfDB and others in market-oriented agricultural infrastructure investment programmes in Africa. It called for an integrated approach to investment that gives priority to 'last-mile' infrastructure in order to maximize benefits from existing and future major infrastructure development.

Critical evidence for negotiating the Framework Economic Partnership Agreement between EAC and the EU

In 2008, the EAC negotiated a Framework Economic Partnership Agreement (FEPA) that covered trade in goods and market access, development cooperation and fisheries. EAC Partner States realized they did not have good and accurate evidence readily available to them as a basis for negotiating a full EPA. Several concerns were raised amongst Partner States. Firstly, EAC countries anticipated that giving preferential access to EU products under a reciprocal arrangement would put local agricultural producers at risk of increased competition. Secondly, cutting tariffs for EU products would result in a sizeable loss of tariff revenue and thirdly the timetable for the negotiations and their implementation was extremely tight.

In 2008, Kilimo Trust provided a grant to support the efforts of the EAC towards enhancing their negotiating capacity. They funded a study to provide critical evidence-based analysis relating to the concerns raised for the agriculture sector. This included a review of the opportunities arising from the FEPA including, the positive and negative effects of EAC liberalisation, the regional competition experienced from the EU for EAC exporters to COMESA and SADC markets and the impacts of the interim Economic Partnership Agreements (IEPAs) as well as the general impact of European agricultural subsidies on EAC exports.

The study proposed several flanking measures to support the 'soft' and 'hard' investments needed to allow stakeholders to respond to the opportunities and challenges of the FEPA. It also formed an input into the preparations that EAC Partner States made for the final round of negotiations on how agriculture would be dealt with in the EPA. It resulted in a joint

EAC-EC Ministerial Meeting that was preceded by a joint EAC-EC Senior Officials Meeting. Kilimo Trust participated in these meetings. One key output of the study was to inform the further discussions on the draft agriculture chapter in general and in particular, the list of products to be inserted in the Article on Export Subsidies and Domestic Support.

Scoping the livestock Product Value Chains in East Africa

A study commissioned by Kilimo Trust found that, livestock and livestock products generate higher and more reliable incomes compared to most other agricultural activities and that, smallholders are the dominant players in the livestock meat and dairy value chains including retailing. Globally, this is an expanding market and while sub-Saharan African countries cannot yet compete with major exporters in the developed world because of serious barriers such as food safety requirements, there are still significant national and regional markets to consider. A substantial proportion of East Africa's wealth is tied up in livestock. Annual trade is valued at about US\$5 billion and represents 12% of the region's GDP. There is already a trade deficit in the region and this is likely to grow in the coming years as people's wealth improves and their diets change from starch to protein based foods. All this suggests that there is considerable potential for livestock-keeping households to increase their incomes.

The scoping and preliminary mapping study undertaken by Kilimo Trust was designed to identify the most promising value chains for the livestock trade within and among the five Member States of the East African Community (EAC) – Tanzania, Kenya, Uganda, Rwanda Burundi. The purpose was to confirm demand and articulate what stakeholders consider to be the most critical gaps in terms of information and evidence needed to develop strategies for improving trade in livestock and livestock products within the region.

Market opportunities and prospects

According to the study, estimated livestock assets in the region are 41 million heads of cattle, 33 million goats, 14 million sheep, 3 million pigs, 900,000 camels and 130 million poultry. Evidence from case studies suggests that published data under-estimates livestock numbers and this adds to the premise that, a significant proportion of wealth in East Africa is held in form of livestock. Estimates of the value of products harvested each year in the region (at world prices) indicated a total annual value of US\$5 billion, which if realized, would be about 12% of the reported GDP of the EAC Partner States combined.

Despite these large livestock populations, the production of different livestock products for the market is poor and frustrating that poverty is very widespread in livestock-keeping areas despite livestock products being so well valued and in demand (ILRI, 2002). In Tanzania for example, agro-pastoral and pastoral areas own 95% of the cattle population, yet most of these households live below the poverty line of US\$1.25 per day.

Regional projections based on current per capita levels of meat and milk consumption showed that even though there was substantial (official and un-official) cross-border trade of cattle and small ruminants, all EAC countries (except Kenya who is a net exporter of dairy products) would continue to have deficits of both meat and dairy products as a result of increasing per capita consumption resulting from increased incomes and urbanisation. This means there are opportunities to expand trade in livestock and livestock products within each country and between countries in the region. There is also great potential for East African countries to export to the Middle East, North Africa and other countries in SSA where there is high demand for livestock and livestock products.

The major livestock value chains

The study confirmed that of all the livestock value chains, meat and dairy were the most important in the region. The meat livestock chain is dominated by beef and traditional chicken with about 1.1million MT produced annually. Jointly, Tanzania and Kenya

overshadow the other countries accounting for 74% of the entire region's production of livestock for meat. Using world prices, this business was valued at US\$3.3 billion per year. The primary producers are pastoralists and agro-pastoralists located in arid and semi-arid areas – some 3.9 million households. They produce 95% of the beef cattle and almost all the small ruminants.

Despite the pastoralists' large cattle population, their annual off-take rate was low (8-10%) compared to that of commercial ranches at 12-15%. For poultry, 70% is produced for local consumption while the remaining 30% is produced for sale by medium and large-scale enterprises. Similarly, about 65% of pig production comes from smallholders though commercial producers are increasingly becoming important in peri-urban areas. The smallholders operate in a challenging environment and for this reason, the meat value chain is commercially constrained.

Bulking often takes place in rural livestock markets organized about twice a week. Bulking agents then transport the livestock in trucks over long distances and re-sell to large traders, exporters, meat processors, small-scale butchers or in the case of small ruminants and poultry, to retailers in urban areas. Small traders handle between 60% of the trade in cattle and 90% in small ruminants. They also dominate the wholesale trade, although processors are also involved in the trade.

About 85% of processing is conducted by community-owned slaughter slabs that are common in large towns and cities. These are linked to butchers in the rural areas and small towns. There is only limited processing by large-scale slaughter and meat packing factories and so they tend to operate below capacity. Formal processing of poultry is done by large-scale producers who slaughter, dress and pack broiler chicken.

Retailers provide services to the final consumer in local markets, butcher shops, supermarkets and cooked meat outlets like hotels, restaurants and even road-side vendors. The final consumers constitute both rural and urban dwellers, business travellers and tourists.

According to the study, the meat value chain had the greatest potential for reducing poverty among the livestock value chains in East Africa, a potential that stems from participants who earn income at different stages in the meat chain including production, bulking, trading, processing and retailing of raw or cooked meat. The majority of the participants are resource-poor smallholders.

The dairy value chain, has an estimated annual value of US\$1.6 billion and is dominated by Kenya which accounts for nearly 75% of recorded milk production in the region. All the other EAC Partner States have a milk deficit based on current per capita consumption. Just like meat, dairy production is dominated by smallholders practising zero-grazing in the highland areas of Uganda, Kenya and Tanzania. Milk is bulked for the commercial market and collection is organized by cooling centres owned by producer associations or processors. Trucks or cooled tanks are used to transport the milk to processing plants. Processing remains largely informal, at household and village levels, accounting for 80% of all milk marketed in the region. Milk retailing takes place through milk kiosks, shops, supermarkets and hot beverages outlets.

Issues of concern to stakeholders and their validation

The study identified four major issues of concern. These are low productivity, poor handling and processing, inadequate marketing and trade and weak policies and institutions. Whereas many projects and programs in the region were designed to deal with these issues, many had not succeeded for two reasons. First is the poor quality of data for planning. Collecting and data analysis has been long neglected right across the livestock sector and so, information is unreliable and there is a lack of baseline data which has led to many projects pursuing wrongly identified objectives. Second is the poor integration of different projects and programs.

The study concluded that, the problems facing the livestock sector, as identified by stakeholders, are not due to lack of effort but rather the result of poor vertical integration along the value chains. There

is a distinct lack of knowledge of the dynamics of markets and of acceptable grades and standards and even the most recently proposed development programs (e.g in Kenya) do not put enough emphasis on the development of markets. Even for projects with a focus on market development, it was not usually very clear what funds set aside for market development would do.

To develop a sustainable market-driven livestock sector, the producers need to achieve the highest possible price-to-cost ratio while producing quality livestock and livestock products, whereas consumers are looking for high quality products at competitive prices. This should be the guiding principle in all livestock development programs hence the desperate need for studies that can improve data collection and analysis to support the planning process.

A strategic study was recommended to quantify the final markets (national or regional) for livestock and livestock products within East Africa and develop baseline data for planning. The objectives for this study would be to:

1. Identify the most important market segments for the major livestock products,
2. Determine and quantify the distinctive characteristics of each of these market segments,
3. Determine the critical success factors for each segment and
4. Identify priority investments needed to facilitate the performance of various value chains for livestock products with greatest potential in terms of market size and growth.

Development of E3ADP

Kilimo Trust commissioned a report to identify the key challenges facing these industries and note the emerging opportunities for investment. The report revealed the following characteristics:

1. Agricultural value addition contributes to more than 80% of the total manufacturing in the EAC Region;
2. Only about 28% of the agricultural produce in the region is processed;

3. Food processing accounts for 40% of the value added by agro-industries and about 30% of the total manufacturing in the region; and
4. The highest proportion of the installed capacity for food processing is for primary processing only.

Low utilisation of installed capacity: Agro-industries in the EAC are largely operating at low levels of capacity utilisation, with most operating at 30–50%. This is due to a combination of factors such as (i) unreliable supply of good quality raw materials and inputs; (ii) the scatter of the small quantities produced by each smallholder farmer; (iii) long distances between areas of production and location of agro-industries coupled by poor transportation infrastructure (see section 2.3). For reasons of access to power and other industrial inputs, most large agro-processing facilities are located in urban areas, sometimes very far from the major production areas. This increases the distances to which raw and bulk materials have to be transported to the processing plant.

Limited technical skill base to run agro-processing facilities: There is little vocational training deliberately focusing on agro-industries. This leads to inadequate technician skills required to operate and maintain agro-processing plants and equipment. This inadequacy coupled with the fact that most of the technology used by the agro-industries is imported leads to poor maintenance and performance of equipment.

Inadequate R&D: Although R&D is not the only driver of innovation, it plays a crucial role including building local capacity to search for import and absorb knowledge and technologies from other countries. Therefore, currently low public and private R&D on agro-industries is a major obstacle to the development of this sector. There is an urgent need to build linkages between NARES, the private sector (from inputs suppliers to retailers of different agricultural products), development supporting organizations and other public institutions especially those undertaking industrial research. This should be designed to accelerate the use of existing knowledge and technologies while expanding indigenous capacity for the generation of new knowledge and technologies.

Un-conducive business environment: The EAC Region faces special challenges in dealing with inefficient customs procedures and high charges imposed on goods in transit. While each additional day a shipment is delayed reduces trade by at least 1%, time-sensitive products, such as fresh agricultural produce are reduced by 6 times that amount. In addition, imported food products that directly compete with locally manufactured agro-products makes local industries less competitive. This is further compounded by importation and manufacture of sub-standard products that find their way on to the market.

Limited supportive infrastructure: This was found to be a critical constraint to the development of agro-industries both from the perspective of supply of raw materials and the marketing and trade of finished products. (This is further discussed in the next section 2.3). It is worth noting that, major agro-industries are located along the major transportation corridors, which in the EAC also coincide with main transmission lines for grid electrical power. Therefore, data from Tanzania show that rice and maize producing areas with power and road infrastructure seem to have attracted the most private investment in storage and primary processing facilities.

Key Opportunities in agro-industries development

Rural-based primary and secondary processing, especially increasing the length of stable shelf-life of major perishable commodities, is the highest priority at the moment. This is because larger agro-industries are difficult to locate in rural areas for a number of reasons, while it is neither cost-effective nor effective in reducing post-harvest losses if perishable commodities are transported for long distances before processing. This opens up opportunities for small to medium scale agro-processing industries.

Tertiary processing of cereals to high valued differentiated products is the second most important opportunity due to the relatively advanced

primary and secondary processing of cereals already existing. There is therefore an opportunity for further processing into highly differentiated consumer and industrial products.

Equipment manufacturing and supply, is the third high priority opportunity to service the two priorities mentioned above. Most of the agro-processing equipment in the EAC region is currently being imported from China and India and given that the technology is not complicated, there is a significant opportunity for import substitution.

Policy Roundtable Dialogue by Directors

The Directors endorsed the priority themes and results recommended for a regional programme – East Africa Agro-industries and Agro-enterprises Development Program (E3ADP), and further, endorsed the development of the Programme to produce the following results:

- a) **Theme 1: Accelerated Development of Agro-industry** – designed to mainstream agro-industries in key agriculture for development programmes and agro-enterprises, with the following intermediate results:
- i) A critical mass of skilled personnel to plan, establish, and effectively manage agro-industries;
 - ii) Well organized and strong regional agricultural value chains for regular and quality supply of raw materials;
 - iii) Improved culture of quality and productivity;
 - iv) Regional agro-industry clusters;
 - v) Centres of excellence, business incubation and BDS across the region to support especially SME agro-industries and agro-enterprises; and
 - vi) Regionally coordinated R&D in agro-industries to stimulate innovation.

- b) **Theme 2: Getting Markets and Trade Right** – is critical in accelerating development of agro-industries. The workshop recommended that E3ADP should be designed to deliver the following results:
- i) Harmonized regional standards;
 - ii) Robust Regional Market Information System supported market research;
 - iii) Minimum NTBs or none at all across the region;
 - iv) A strong EAC agro-industry association;
 - v) Strong regional value chains;
 - vi) Regional brands to support export of agro-industry products; and
 - vii) Vibrant regional commodity exchanges.
- c) **Theme 3: Making Existing and Planned Infrastructure Effective in Supporting the Development of Agro-Industries and Agri-enterprises.** It was acknowledged that, there are already major initiatives in the EAC on infrastructure development and so the E3ADP would focus on:
- i) Improved coordination and synergy in the development of infrastructure vs. agro-industries;
 - ii) Strategy for expanding last-mile infrastructure to ensure the infrastructure enables a stable and continuous flow of raw materials to agro-industries; and
 - iii) Agro-industry clusters are deliberately designed and located to effectively utilize the existing or planned infrastructure.
- d) **Theme 4: Policy and Institutional Framework** to enhance a “business climate” for agro-industries and agri-business. It was noted that relevant policies are generally in place – what remains is implementation. Therefore, on this aspect, E3ADP will strive to ensure:
- i) Consolidated regional strategy for agro-industry development;
 - ii) Regionally shared “public good” services to support agro-industries and agri-enterprises;
 - iii) Regionally-shared support industries such as manufacture of processing equipment;
 - iv) Strong synergies between agro-industries development and other programs in agriculture and industries in general; and
 - v) A mechanism for strong coordination among Government Ministries and EAC Departments working on agro-industries and agro-business.
- e) **Theme 5: Attracting finance and investment** for agro-industries in the region by focusing on regional opportunities for collaborating with stakeholders to mobilize and put in place the necessary incentives and resources to make agricultural finance more accessible.

Vision of E3ADP

An agriculture sector in the EAC partner states, which supply high-valued and differentiated food, fibre, feed and other agricultural products for local, regional and international markets.

Value Chain Study of Smallholder Dairy in Central Kenya

Examining challenges to open up investment

Over 600,000 smallholder farmers in Central Kenya derive their livelihood and income from dairy farming. As smallholders, they find it difficult to access the growing commercial market for milk and dairy products both in Kenya and in the region as a whole. They are frustrated with technical, economic and institutional challenges that lead to low earnings, irregular income and general disillusionment. A recent study suggests that, getting together in producer groups and encouraging investment all along the value chain can revitalise this rural industry for the benefit of smallholders, processors, traders, transporters and consumers.

A recent study funded by Kilimo Trust and led by Jomo Kenyatta University of Agriculture and Technology (JKUAT) and others examined the dairy value chain for the smallholder dairy sector in Central Kenya; the challenges facing key players such as farmers, traders, processors, government agencies and the investment needed to promote growth and competitiveness in this important and potentially lucrative rural industry. The study revealed that, the dairy sector in central Kenya is comprised of over 600,000 smallholder dairy farmers, 80 dairy cooperatives, about 200 Dairy Farmers Self Help Groups and a number of emerging federations bringing farmers together to deliver the large milk volumes that are attractive to commercial milk processors. The processing sector is dominated by three organizations – Kenya Cooperatives Creameries, Brookside Dairies and Spinknit – four major cooperative societies, and eight private processors. There are also about 10 registered private milk traders each handling over 10,000 litres of milk per day and about 1000 scattered small-scale informal milk traders and hawkers who sell milk in the towns.

However, milk production among smallholder farmers remains low. Average production is only 1000 litres per annum per cow compared to the world best practice of 8,000 litres per annum. There are various reasons for this including high production costs, genetically poor livestock breeds, limited access to quality feedstuff and fodder and a lack of support from good veterinary, extension and credit services.

In the few places where there are milk surpluses, supplies can be erratic because of unfavourable weather conditions and a lack of animal feedstuff. There is also a dearth of milk cooling facilities to store surplus milk and appropriate transport facilities to distribute it. Export markets are also weak and comprise of only UHT and fermented milk. The opportunities to add value to milk are considerable but they are not being exploited. Less than 3% of fresh milk produced in Kenya is currently processed into cheese, butter and ghee.

Although local annual per capita milk consumption is 80-100 litres, the demand for milk and dairy products in COMESA and EAC countries is predicted to grow at 3.5% annually up to 2020. This means, there are good opportunities for smallholders to engage in this market but much needs to be done to support this. The report recommends the introduction of genetically improved dairy cows to raise production and attain marketable milk volumes so that farmers can get premium prices.

On-farm support is also recommended to improve farm enterprise management - by popularizing the use of high value forage crops and enhancing fodder preservation for dry seasons; investing in storage facilities for natural fodder whilst promoting home feed rationing to reduce costs. This would provide opportunities for farmers and youth entrepreneurs to set up cottage feed mixers and cooperatives and farmer groups to set up small feed mills.

The report also recommended the formation of producer groups so that smallholders can work together to take advantage of these opportunities. Forming and strengthening such groups will improve their effectiveness as centres for improvements in milk marketing, farmer training and providing comprehensive support services in partnership with other service providers.

Further along the value chain, investment will be needed in refrigerated vehicles to increase the capacity to produce UHT and powdered milk and added value products such as cheese and butter.

At the national level, the dairy industry needs support to stabilise the industry by promoting the values of local milk consumption, establishing school milk programmes including dairy products in the stocks of national food strategic reserves, improving road network and infrastructure as well as developing and implementing quality control mechanisms for the industry.

The potential for smallholders to enter the dairy value chain is significant and some are already taking this step. A most positive outcome is that, farmers feel empowered to negotiate better prices and improve their access to extension, feed inputs and AI services through contractual arrangements. Dairy Self Help groups that have supply agreements with processors receive a premium price for supplying milk in large volumes ranging from US\$ 0.05-0.11 per litre above the prevailing market price. This is mainly attributed to the convenience that bulk buying brings to the buyer.

Going forward, Kilimo Trust and current partners will be seeking opportunities to collaborate with other organisations in the private and public sector to build on the identified opportunities for the benefit of smallholder farmers.

Strategic Study of the Smallholder Dairy Sector in Central Kenya –JKUAT

The African Agribusiness and Agro-industries Development Initiative (3ADI)

There is an emerging consensus in Africa that, if agriculture is to be the main sector to stimulate economic growth then, investment should go beyond the current focus of improving on-farm productivity and include the development of agro-industries and other post-production links in agriculture value chains.

It was with this in mind that the African Agribusiness and Agro-industries Development Initiative (3ADI) was launched by the Governments of African States in a high level meeting held in Abuja, Nigeria in 2010. 3ADI is a partnership comprising UNIDO, FAO, IFAD, African Development Bank (AfDB), the African Union Commission (AUC) and the United Nations Economic Commission for Africa (UNECA). Its goal is to have an agriculture sector in Africa which by the year 2020, is made up of highly productive and profitable agricultural value chains. To achieve this, Africa will need competitive, sustainable and inclusive agro-industries and agribusinesses as a pathway to increased economic growth and food security in the continent.

This focus on promoting efficient value chains is very much in line with the strategic framework of the Kilimo Trust and in recognition of this, the Trust was asked to make technical inputs which prepared the way for the launch of 3ADI. Kilimo Trust's CEO was a member of a group of three African Experts who presented the initiative to the meeting in Abuja. His contribution was highly appreciated making Kilimo Trust one of the recognized organizations for the implementation of the initiative in East Africa.

While endorsing 3ADI in March 2010, the Heads of State and Government present:

- **Noted** that, several African countries are now registering agricultural surpluses especially in food commodities and that most of this surplus is going to waste due to lack of processing and marketing;
- **Urged** African countries to establish the requisite legal, regulatory and institutional framework at national and regional levels to support agribusiness and agro-industry development;
- **Undertook** to strengthen the capacity of and linkages among relevant agencies needed for the different elements of 3ADI;

- **Agreed** to fast-track the implementation of regional trade agreements in relation to agro-products;
- **Urged** member states to put in place programmes to accelerate the development of food value chains of strategic food commodities and the reduction of the extent of food imports into Africa; and
- **Requested** African Union Member States to facilitate the implementation of 3ADI.

In response to this call, the EAC plans to implement a regional program – “East African Agri-enterprises and Agro-industries Development Program (E3ADP). The EAC Secretariat has signed an MOU with Kilimo Trust to manage the technical, financial and administrative implementation of the program. The goal of E3ADP is to ensure that, a high proportion of the agricultural commodities produced in the EAC is transformed into differentiated high value products in the form preferred by the final consumer. The Food and Agriculture Organization of the United Nations (FAO) is supporting a Technical Cooperation Programme (TCP), designed to build sustained interest, support and financing of the implementation of E3ADP. The outputs of the TCP are: (i) An East African Agro-industries and Agro-enterprise Development Programme (E3ADP) developed, documented and approved by the relevant EAC organs; (ii) Model investment plans and projects developed with identified potential financing for their implementation; and (iii) Improved capacity of EAC Secretariat and institutions as well as regional implementation partners in coordination and implementation of E3ADP and related development programmes in agro-industries and agro-enterprises.

Feasibility of a Common Strategy for Food Security in the EAC

The 2009 US-Africa Business Summit

Harnessing African potential

One of the NEPAD's major successes has been the encouraging positive response by the private sector to changing their negative perceptions of Africa. Through participation in many international forums and show-casing developments on the continent, there is a noticeable change in how Africa is perceived. One of the best partnerships in this area is the US Corporate Council on Africa (CCA), which since 1997 has held biennial US-Africa Summits under the auspices of NEPAD with the aim of promoting investment between Africa and members of the CCA. Since its inception in 1997, in Chantilly, Virginia, the CCA US-Africa Business Summit has brought together Heads of State along with other government and business leaders to engage in dialogue on US and Africa trade, economic and political relationships.

In 1997, 2000 participants gathered in the first Africa business-focused conference of this scale in America. Those attending included Secretary of the Treasury, Robert Rubin, then First Lady, Hillary Clinton, and several African Heads of State. Hillary Clinton addressed participants in what has since proved to be prophetic words: "We want Africa to be a strong partner for peace, prosperity and progress in the 21st Century. Today the questions for all of us who care about the future of Africa is: What can be done to sustain and deepen the democratic and economic transformation that is now underway?"

Kilimo Trust participated in the 7th biennial CCA US-Africa Business Summit that was held at the Walter E. Washington Convention Center in Washington, D.C. from 29th September to 1st October 1, 2009. The event drew more than 1,300 attendees from 58 different countries – including representatives from U.S. business and government agencies, six African heads of state, more than 390 presenters and a record-breaking number of sponsors. Themed "Realizing the Investment Power of Africa" the summit focused on agribusiness, financing, health, infrastructure, natural resources development, power and tourism. Dr Stephen Kimani, the Programme Manager of Kilimo Trust, led a delegation of 5 people, including the Mayor of Kigali City (Dr Aisa K Kacyira) and the CEO, Kenya Gatsby Trust (Mr Valentine Miheso).

While the core portion of the program occurred during these days, the summit was complemented with a number of side events that also focused on trade and investment between the US and Africa. In addition to the 65+ plenary and workshop sessions,

the summit included an EXPO, two formal dinners, an internet café, business-to-business matchmaking program, "Doing Business in [country]" forums, a sponsor hospitality suite and one-on-one private meeting space. The Trust rented a booth at the convention, displayed promotional materials, and raised awareness of its work on the Nairobi and Kigali Wholesale markets and other selected projects with investment opportunities.

Many called this summit the best yet. For the second time in the Summit's history, the Secretary of State, this time Hillary Clinton, led the American Government representation, along with US Trade Representative, Ron Kirk. Also for the first time, CCA's sister organizations from Canada, Europe and Japan as well as its key organizational partners in Nigeria and South Africa met to lay out a long-term strategy for cooperation on Africa.

The CCA US-Africa Business Summit remains the single-most important US-Africa economic conference. It is the premiere event for finding and building partnerships. Businesses of all sizes, representing various industries were in attendance from nearly every country in Africa as well as from across the United States and other parts of the world. Global leaders agreed that the solutions to African problems are complex and multifaceted. There can only be success once perceptions of Africa are true and correct with an understanding that Africa is not looking for more handouts but opportunities for investment and greater trade.

Towards an African Green Revolution

The recent launch of several major Africa-wide initiatives, including the Comprehensive Africa Agriculture Development Programme (CAADP) of the New Partnership for Africa's Development (NEPAD), the Alliance for a Green Revolution in Africa (AGRA), and the Millennium Villages Programme, reflect renewed interest and a willingness to invest considerable resources in African agricultural development. Wisely managed, these efforts could lead to a new era of responsible and streamlined investment, capacity building, technical innovation and policy change. These in turn could release many millions of Africans from hunger and poverty, setting in motion a virtuous cycle of economic growth and rural regeneration. At the same time, Africa faces urgent new challenges. The present food price crisis has increased the cost of staple foods in most countries and has adversely affected many poor consumers in Africa and around the world.

To address these issues, the Salzburg Global Seminar in partnership with the Future Agricultures Consortium and the Institute of Development Studies, created a multi-year initiative consisting of a series of linked events. The aim was twofold. Firstly, it would enable proposals for a “Green Revolution” in sub-Saharan Africa to be tested and refined through dialogue between those who support this approach and a wide range of experts drawn from different sectors and regions. It would help proponents to think things through and engage in constructive dialogue with their critics to ensure that their efforts proceed within a broad policy framework which takes account of institutional, political, socio-economic and technical prerequisites. Secondly, it would better define a holistic development framework within which new investments in African agriculture could be positioned. It would further enable other new efforts and investments in Africa to be streamlined to stimulate additional investments which reduce poverty decisively whilst promoting sustainable economic growth and opportunities.

In 2008, the initiative was launched at a landmark conference - *Towards a “Green Revolution” in Africa?* – held at Austria’s famous Schloss Leopoldskron in Salzburg. Kofi Annan was the keynote speaker. The event assessed the most critical issues and reviewed, refined and articulated an agenda for a new “Green Revolution” within a sustainable development agenda for sub-Saharan Africa. In particular, the Conference sought to examine the mental frames and underlying assumptions that guide current policy and practice,

with a view to enabling the articulation and implementation of an African paradigm, growing out of African conditions and solutions.

The conference brought together 113 stakeholders from within Africa and beyond. Donors included Kilimo Trust, Bill & Melinda Gates Foundation, The William and Flora Hewlett Foundation, The Rockefeller Foundation and UK Department for International Development (DFID). The delegates examined the emerging agricultural development framework in Africa in which a Green Revolution agenda could be set, identified opportunities for adding value to partnerships and recommended specific actions for implementation. Kilimo Trust’s CEO participated and noted a strong alignment between the issues and strategic actions identified at this conference and those identified by Kilimo Trust. The Trust agreed to establish closer working relationships with CAADP and the other major players in Africa’s Green Revolution. From side meetings convened to promote Kilimo Trust and lobby for support, the Trust was requested to convene a dialogue regarding the possibility of Bulk Procurement of Fertilizers for East Africa.

Kilimo Trust awarded the conference organisers a grant of US\$25,000 to support the participation of key Africans and this in turn promoted the Trust’s work among global actors on the African Green Revolution.

The priority issues articulated by multiple stakeholders at the conference and in the seminar included: increasing food crop **productivity** through technological innovation; placing greater

emphasis on **agricultural growth** by improving market opportunities for smallholder producers; emphasizing **rights and equity**; and assuring **sustainability** of interventions through learning from the social and environmental lessons of the Asian Green Revolution. Here below is an outline of the key strategic recommendations identified by the delegates under each of the six core themes:

Institutions and innovations

- Establish an Africa-wide farmer-owned and farmer-driven fund for directing research, innovation and technology development geared to farmers' needs and to build capacity of farmer and pastoralist organizations.
- Focus on transforming agricultural education and training.

Markets, trade and investment

- Adopt Comprehensive Africa Agriculture Development Programme (CAADP) Pillar II for investments in markets and trade.
- Invest in management capacity and risk-sharing through agro-enterprises and cooperatives.
- Develop regional and national policies to address constraints in value chain development.

Environmental sustainability and biodiversity

- Reverse soil depletion and raise productivity through capacity building and data collection.
- Promote integrated community water management mechanisms and other water actions.
- Create an inventory and promote sustainable use of African agricultural biodiversity.

Governance and policy processes

- Improve policy relevance and forums to allow State and non-State actors to respond to policies.
- Strengthen mechanisms to improve accountability of State and non-State actors.

Equity, rights and empowerment

- Promote collaborative partnerships to access innovative financial resources for smallholders.
- Build capacity for smallholder farmers and farmer organizations.
- Promote inclusive two-tier meetings for producer groups at district and national levels.

New threats and opportunities

- Adapt long-term solutions for production and marketing systems to address climate change.
- Develop real-time climate and weather forecasting information systems.
- Reduce short-term vulnerability to climate change through social protection measures.

A central message from the conference was that moving in a unified direction, with a clear vision and concrete goals was the key to the future of agriculture in Africa. It was acknowledged that a “one size fits all” solution would not work on the continent. Instead, a new approach was required that would move away from the single “silver bullet” concept towards a multi-hued “mosaic” approach that went beyond a production–growth focus to include issues of environment, biodiversity, equity and rights. This raised questions of investment, not only in technology and infrastructure but also in social, political and institutional structures. The challenges of technology development and delivery to African agriculture demand more than major investments in developing new seed varieties or fertilizers. They also require bold new programmes and new ways of organizing and governing the agricultural innovation process. This includes developing an agenda for changing agricultural innovation systems through participatory and inclusive learning approaches. Central to these possible solutions are critical political, economic and social factors. Rather than advocating a technocratic approach to driving broad-based development in Africa, a more politically sophisticated stance is required. In particular, greater emphasis needs to be placed on understanding and influencing processes of agricultural innovation, intervention and policy, not just defining their technical content. In summary, such an agenda demands a cross-disciplinary approach: bringing the best of economic and technical analysis together with insights from socio-cultural and political analysis.

Following these first two events in Salzburg, the strategic action recommendations were shared through a series of sub-regional meetings held in Africa to further test, refine and contextualize them. Working at increasing levels of detail and enabling the participation of additional national and local actors, finally leading to an action plan that is based both on the priority issues and grounded in the realities of the African context(s).

OUR HUMAN CAPITAL

The Board of Trustees

During its formative first six years, Kilimo Trust was in the hands of Trustees who are passionate about improving the livelihoods of smallholders in agricultural value chains – by focusing on the development of profitable small and medium scale enterprises both on and off the farm. The Board of Trustees in office during the period comprised of well-respected professionals, business people and entrepreneurs from the EAC Partner States, South Africa and Britain. Together they brought to Kilimo Trust, first-hand experience on agriculture for development gained over many years of working in senior positions with national and international public and private organizations/companies.

William Kalema - Chairman

William is a management consultant based in Uganda where he is a prominent member of the private sector. He is a Director of DFCU Bank Ltd, Multichoice Uganda and East African Breweries. He is a Director of African Agricultural Capital, a Trustee and Chairman of Uganda Gatsby Trust, a Trustee of the Shell Foundation and Investment Climate Facility for Africa. He previously chaired the Uganda Manufacturers Association and the Uganda Investment Authority. He was educated at Cambridge University and the California Institute of Technology and worked for the Du Pont Company in the USA. William was a member of the Tony Blair's Commission for Africa in 2005 that provided a rationale and momentum for such initiatives as extended debt relief, greater focus on trade reform and improvements in the volume and quality of development assistance.

Laurence Cockcroft - permanent trustee

Laurence has worked in Africa since 1966 on agricultural and agri-business development for governments, the corporate sector, international development agencies and private sector foundations such as GCF. Laurence holds an economics degree from Cambridge University and in 1989 he published 'Africa's Way: A Journey from the Past' – a book on the interface between economic development and political and social issues. He is a founding Board member of Transparency International and is currently Chairman of its UK chapter.

Joseph Mukiibi - permanent trustee

Joseph is a plant pathologist who has published widely on tropical crop diseases. He was professor and head of crop science at Makerere University and was responsible for setting up the Ugandan National Agricultural Research Organisation (NARO). He was educated at Makerere and St Andrews (UK) and has undertaken research at universities in Kenya, Tanzania and California. Joseph has extensive international research experience. He worked at the International Institute of Tropical Agriculture (IITA) in Nigeria and has since served on many boards including the IITA, the International Centre for Tropical Agriculture (CIAT) in Colombia, the Commonwealth Agricultural Bureau International (CABI) and the Technical Centre for Agricultural and Rural Co-operation (CTA). He now consults on institutional reforms in African agricultural research and chairs boards of several community based organisations.

Esther Kahangi - permanent trustee

Esther is the Deputy Vice Chancellor, Research, Production and Extension at the Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Kenya. She has worked as a Regional Coordinator for BIO-EARN – the US\$11 million Regional Programme and Research Network for Biotechnology, Biosafety and Biotechnology Policy Development. She undertakes biotechnology research for the development of a more productive and sustainable agricultural sector and bioresource economy in Ethiopia, Kenya, Tanzania and Uganda. She is well known for delivering impacts, having

pioneered Kenya's tissue culture banana – one of Eastern Africa's great agricultural biotechnology success stories. She is the recipient of many awards. Esther is a Fulbright Senior Scholar. She was named by local magazines as the Woman of the Year 2004 and one of the Top 50 Women in East Africa in recognition of her contributions to technology development for reducing poverty among farming communities.

Barnabas Zegge - trustee

Barnabas is Tanzanian and a retired World Bank agricultural economist. He has extensive international and national experience in public and private sector development management with the Tanzanian civil service, the East African Development Bank and the World Bank.

He has led various World Bank assignments in the SADC countries, Turkey and Central Asia where he formulated and managed a wide range of rural investment programmes from smallholder agriculture, forestry and livestock to research and extension, post harvest, marketing and rural finance. He has managed and prepared rural sector studies and analyzed the operation of agriculture-based small and medium-scale enterprises and advised on options for appropriate capital structure, sources of finance and marketing strategies.

Ahmed Abdallah - trustee

Ahmed is the Chairman of Corporate Insurance LTD in Kenya and a consultant to national and international organizations. He has served in various capacities in the Kenyan Public Service since 1961 in ministries such as Local Government, Public Works and Communications, Ministry of Agriculture and Office of the President. Ahmed is a graduate of Makerere University (1961) and is among the pioneers of indigenized Public Service in East Africa, after independence. In 1967, he was appointed the founding Deputy Governor of the Central Bank of Kenya where he worked for 18 years. Ahmed then worked for the International Monetary fund as an alternative director representing 17 Anglophone countries (1984-1988).

Adam Brett - trustee

Adam is an entrepreneur who worked with small and medium-scale enterprises in Africa, Asia and the UK since early 1990s. Trained originally as an economist, he now runs pro-poor Fairtrade businesses concentrating on basic foods such as dried fruits and nuts. Adam's UK business, Fullwell Mill Ltd, won the Worldaware World Vision award in 1999, the Natwest Social Business Award in 2003 and came seventh in the UK government's 'Inner City 100' as one of the fastest growing SME business in the UK in 2005. His Ugandan business, Fruits of the Nile, supplies major UK retailers and in 2008, he won the prestigious Ashden Award for Renewable Energy. He has extensive knowledge of modern interlinked food supply chains with customers in Europe and Japan. Adam believes that, modern information technologies are a key to positive development as they make knowledge available to everyone and open doors for disadvantaged producers.

Adam has been consulted by organisations such as Natural Resources International, Research Into Use and NGOs such as the Aga Khan Foundation and the Commonwealth Secretariat.

Felicity Blakeway – trustee

Felicity Blakeway has been involved in research management in the forestry and forest products sector for the past 15 years and has worked in East Africa since 1995 on forestry and forest product development projects. She has experience in the corporate sector and in research and academic institutions. Flic has a Masters degree in plant biotechnology from the University of KwaZulu Natal, and has diverse experience in strategy development, project co-ordination and management and human resource development and mentorship. Flic's publication record includes 15 peer-reviewed publications and two book chapters and she has refereed publications for international journals.

The Management Team

The work of building Kilimo Trust and implementing its work captured in this report was done by a small team of technical and administrative staff made of citizens of Uganda, Tanzania, Kenya and the USA. The team was deliberately kept small to contain overheads so as to ensure that a large proportion of funds available to Kilimo Trust were spent on program implementation on the ground.

Dr. John K. Lynam – CEO (2005 – 2007)

Dr. Lynam was the founding CEO of Kilimo Trust and initiated many of the projects implemented during the first 6 year period. John brought to the Trust over 30 years' experience in tropical agricultural research in Latin America, sub-Saharan Africa and Asia. He is currently an independent international consultant operating from Nairobi, Kenya. Before joining Kilimo Trust, John worked for the Food Security Division of the Rockefeller Foundation and before that, for the Cassava Program of CIAT. John currently serves on the Board of Trustees of ICRAF. He also serves in the advisory panels for the Collaborative Crop Research Program of the McKnight Foundation, and the M&E Division of AGRA.

Prof. Nuhu Hatibu – Chief Executive Officer

As CEO of Kilimo Trust since 2007, Nuhu is experienced in putting together programmes and teams to deliver regional solutions to local problems. A Tanzanian, Nuhu has lived and operated regional programmes from Kenya and now Uganda. Between 2003 and 2007 while working with ASARECA but employed by ICRISAT and based in Nairobi, Nuhu was the founding regional coordinator of a programme supported by IFAD, which accelerated the development and adoption of policies, strategies and institutional frameworks for holistic management of water for agriculture, in 23 countries (including Rwanda) in East, Central and Southern Africa. Nuhu has been a professor at the Sokoine University of Agriculture in Tanzania where he also served as Dean of the Faculty of Agriculture.

Nuhu has particular experience in working with

officials including Parliamentary Committees, Ministers and Permanent Secretaries and has organized and facilitated policy dialogues sessions of ministers and made key addresses to Summit Meetings of Presidents in East Africa. Since joining Kilimo Trust, he has developed skills and approaches for working with the private sector, especially agribusinesses and commercial banks, which now make him a recognized leader in the development of agricultural value chains in the East Africa Region

Dr. Steven K. Kimani - Program Manager (2007 - 2011)

Dr. Kimani was the Program Manager at Kilimo Trust and was instrumental to developing a robust system for the development, commissioning and M&E of the Grant Projects of Kilimo Trust. Steven brought to Kilimo Trust, over 20 years of experience in participatory research in agriculture with a special focus on natural resources management. Steven has served and continues to serve in several national, regional and international committees related to his areas of specialization.

Mr. Michael Kairumba – Associate Director - Programs

Michael Kairumba is a Ugandan and currently, the Associate Director at Kilimo Trust. He has more than 15 years of experience in commodity trading and agricultural supply chain management in Eastern Africa and beyond. He started his career in the private sector in agricultural export trade and logistics. He has wide experience in value chain and enterprise development, developing service markets (business and financial services) and in project and program management. He has also consulted for a number of international organizations in the private

sector and in international development in Eastern, Southern and Western Africa and in the U.K, in the areas of export market development, industrial processing and technology transfer, business finance, entrepreneurship development, and trade promotion. Michael holds a BSc and MBA.

Christine Alokot-Olaunah – Assistant Director, Agricultural Production Systems

Ms. Alokot, a Ugandan, is an Agricultural Professional with extensive experience in development, implementation and management of smallholder agricultural projects and programs in Uganda and the other East African Community Member States.

This ranges from building farmers institutional capacity to enable them familiarize and adopt available agricultural technologies, raise the required volumes and quality, better negotiations with private sector for input and output markets, overseeing the development of partnerships and implementation of projects with multi-disciplinary organisations and teams ranging from local CBOs to international NGOs and National and International Research Institutes, Universities, Ministries of Agriculture and national Institutions, private sector firms, local governments and farmer institutions across the East African Community.

She joined Kilimo Trust in 2008 as a Program Officer in charge of designing portfolio of projects to be supported by the Trust in response to priority themes and ensuring that each grant made by the Trust achieves the intended results. In her current position as Assistant Director, Christine provides leadership in all aspects of agricultural production systems for all programmes and projects commissioned and/or implemented by the Trust including implementing M&E and impact assessment of the organisation's programmes.

Her experience is backed by an academic background of a Master of Science degree in Agricultural Development Economics from The University of Reading, United Kingdom and a Bachelor of Science degree in Agriculture from Makerere University, Uganda.

Juliet Mmbaga – Program Officer Value Chain Services

Ms Mmbaga, a Tanzanian, has extensive experience in private sector development, capacity building of SMEs and smallholder farmers through business skills training and value addition. She was part of the team that negotiated a partnership with a bank to form Credit Guarantee Scheme. She has assisted in the formation of micro finance institutions. She has experience in project management, networking and creation of public private partnerships. She held advisory positions in programs funded by United Nations and International NGOs in Tanzania, Lesotho, Namibia and Uganda.

Mary Immaculate Mera – Program Officer – Market Access and Business Development

Ms. Mera was Kilimo Trust's Head of Administration in the period 2008 – 2010. During the first six-year period, she was particularly involved in administration of projects. Immaculate holds a Bachelor of Commerce [Marketing] degree from Makerere University, Uganda, and an MBA [Marketing] from Makerere University Business School. She is a CISCO certified network Associate and Human Resource Professional with a Post graduate diploma in Human Resource Management. With her experience and competence in marketing, Immaculate is the current Program Officer, Market Access and Business Development.

Ms. Irene J. Mutumba – Administrative Manager (2005 – 2008)

Ms. Mutumba was the founding manager of administrative and human resource functions of Kilimo Trust, Irene, a graduate teacher by profession and a respected social entrepreneur, brought to the Trust over 10 years' experience in business development, which was vitally important in putting in place the foundation and administration building blocks of the new organization.

Mr. Edward M. Isingoma - Financial Controller (2006 - 2010)

Mr. Isingoma was the financial controller at Kilimo Trust and was instrumental to developing a robust financial management system and internal controls that served Kilimo Trust well during its first six years of grant making. Edward is a member of the Institute of Certified Public Accountants of Uganda and a fellow of the Association of Chartered Certified Accountants. He holds a BSc. from Oxford Brookes University in Applied Accounting and completed and acquired an MBA degree from Edinburgh Business School in 2009.

Deus Tirwakunda (CPA) - Leader of Finance & Administration Division

Deus is the Accountant and Leader of Finance & Administration Division of Kilimo with 8 years experience in Accounting and Finance. He worked with Kazibwe Kenneth and Steven Certified Public Accountants as an Auditor before joining Kilimo Trust in June 2008 as an Accountant.

During the period from 2008 to 2011, Deus was particularly responsible for accounting and financial management of grant projects. He was responsible for reviewing grantee quarterly and annual Financial Reports and advising management. He is currently responsible for the Finance and Administration Division of Kilimo Trust. Deus holds a CPA and is completing a Masters degree in Finance and Control (MFC) from Amity University in India. He is a Member of the Institute of Certified Public Accountants of Uganda (ICPAU) and serves on the Members' Services Committee of the same Institute.

Note:

Since July 2011, Kilimo Trust has expanded rapidly. Consequently, the number of staff has been increased significantly to implement the new mandate of direct implementation of programmes and projects in partnership with and/or on behalf of governments, international and regional organisations and the private sector.

OUR FINANCES

Summary Financial Information

Our finances – Kilimo Trust financial history

Kilimo Trust was incorporated as a company Limited by guarantee on 22 July, 2004. As a company, Kilimo Trust operated between October 2005 and 9th January 2008 when it acquired Trust status under the registered name ‘The Registered Trustees of Kilimo Trust’ with ‘Kilimo Trust’ as the business name.

The Trust was funded by grants from the founders Gatsby Charitable Foundation and The Rockefeller Foundation. Between 2005 and 2011, Kilimo Trust received over US\$ 23,000,000 for its core budget from Gatsby Charitable Foundation and US\$ 3,000,000 from The Rockefeller Foundation which contributed specifically towards investment in the subsidiary arm, African Agricultural Capital (AAC). The subsidiary was established to fund African Agricultural businesses serving the needs of smallholder producers in East Africa.

Investment in African Agricultural Capital

With the funding from Gatsby Charitable Foundation and The Rockefeller Foundation, Kilimo Trust invested UGX 14,486,120,000 (US\$ 8,000,000) in African Agricultural Capital between 2005 and 2009 which represented 85.72% of the total shareholding in AAC. The balance of 14.28% shares was held by Volksvermogen

In 2010, Kilimo Trust sold back its interest in AAC to Gatsby Charitable Foundation at a fair value of UGX 12,353,239,000 suffering a loss of UGX 2,132,881,000 on the investment. At the time of disposal, the subsidiary had invested in over 15 Agribusinesses in East Africa with a mix of both debt and equity investments.

Grant Disbursement

From 2006 to June 2011, Kilimo Trust’s main activity was grant disbursement totalling US\$ 9,058,308 on grant projects described in this report. This represented 67% of the Trust’s total expenditure during the six year period.

Internal Control Systems

The Board of Kilimo Trust has established robust financial and accounting controls which have ensured value for money and efficient running of operations. The Trust has been able to manage grants because of thorough due diligence; supervision missions; and quarterly and annual financial and technical reporting by grantees.

Audit Reports

The Trust’s financial statements were audited by PricewaterhouseCoopers (PwC) for the 5 years to June 2010 while the financial year to June 2011 was audited by KPMG. Kilimo Trust has received an unqualified audit opinion for each of the six year audits.

Tables 1&2 shows extracts of the Income Statement and Balance Sheet for the past Six (6) years financial periods ended 30 June 2011 and obtained from the Auditor’s Reports.

Income Statement

Revenues

Kilimo Trust's Revenue comprises of grants received from Gatsby Charitable Foundation (GCF) - the Trusts founder and main funder as well as other Donors for both grant and operational expenditure. During the six year period, average revenue for the Trust was US\$ 3,917,351 per year.

Grant Disbursement

During the six year period to June 2011, Kilimo Trust's main activity was grant disbursement. From 2006 to June 2011 the Trust disbursed a total of US\$ 9,058,308 on grant projects representing an average of US\$ 1,509,718 in disbursement per year. This represents 67% of the overall Trust's annual average expenditure.

Operational expenditure

Operational expenditure (Non grant expenditure) for the six year period was at an average of US\$ 732,785 per year. This represents 33% of the Trust's annual average expenditure over the six year period.

Deficit from Discontinued Operations

The deficit of US\$ 1,053,795 in 2010 was a result of Impairment loss arising from disposal of African Agricultural Capital (AAC), Kilimo Trusts' subsidiary.

Finance Income

Finance income comprises of mainly foreign exchange gains and interest earned on fixed deposits. The Trust's Finance Income increased by 559% from US\$ 178,889 in 2006 to US\$ 1,179,104 in 2011. The increase was due to the large foreign currency cash reserve (mainly US\$) held by the Trust in 2011 coupled with the continued appreciation of US Dollar against Local currency.

Taxation

Kilimo Trust was granted a tax exemption status by Uganda Revenue Authority (URA) since incorporation renewable every two years subject to compliance with the tax laws of Uganda. The Trust has since renewed its exemption status twice with the current exemption status due to expire in June 2012.

Operational surpluses

The surplus of Income over expenditure for the six year period, which stood at an average of US\$ 1,848,309 per year, has all been transferred to the accumulated fund of the Trust.

EXTRACT OF AUDITED FINANCIAL STATEMENTS FOR 6 YEARS ENDED 30/6/2011

Table 1: INCOME STATEMENT (US\$)

	2010/11	2009/10	2008/09	2007/08	2006/07	2005/06
	US\$	US\$	US\$	US\$	US\$	US\$
Revenue	1,587,267	4,683,833	4,129,919	4,317,029	6,763,466	2,022,589
Other Income	61,315	31,219	5,861	36,987	-	-
Grants Disbursed	(1,371,118)	(1,414,849)	(2,142,343)	(1,728,608)	(1,137,930)	(1,263,460)
Operating Expenses (Non Grant Expenditure)	(960,746)	(888,596)	(707,360)	(795,316)	(666,838)	(377,854)
Deficit from Discontinued Operations	-	(1,053,795)	-	-	-	-
Surplus from Operations	-683,282	1,357,812	1,286,077	1,830,092	4,958,698	381,275
Finance(Costs)/Income	1,179,104	335,899	388,156	(2,337)	(120,532)	178,889
Surplus for the Year Before Income Tax	495,822	1,693,711	1,674,233	1,827,755	4,838,166	560,164
Income tax expense	-	-	-	-	-	-
Surplus for the Year	495,822	1,693,711	1,674,233	1,827,755	4,838,166	560,164

Source: Audited Financial Reports 2006-2011

Equity & Liabilities

The Trust's accumulated fund grew by 1,185% from 1,027,195 in June 2006 to US\$ 13,198,171 in June 2011. The accumulated fund particularly soared in 2011 due to the disposal of the Trusts' subsidiary African Agricultural Capital (AAC) during the year

The Trusts' Total Liabilities (Current Liabilities) also increased significantly from US\$ 51,969 in 2006 to US\$ 137,156 in 2011, representing an increase of 164%. The increase in liabilities has been as a result of the provision for the loan guarantee schemes supported in Tanzania and Uganda.

Non Current Assets

Kilimo Trust's Non Current Assets increased by 386% from US\$ 1,469,533 to US\$ 7,319,558 in 2009 due to the Trust's Investment in its subsidiary AAC. The Investment was later in 2010 reclassified as Non-current Asset held for sale and subsequently disposed of.

By June 2011, the Trust's non-current Assets comprised of property plant & equipment and Loans & Advances (revolving funds to grantees); Uganda Cooperative Alliance, K-Rep Development Agency, Uganda Gatsby Trust and AT Uganda

Current Assets

Kilimo Trust's current Assets increased by 680% from US\$ 1,193,359 in 2006 to US\$ 9,307,510 in 2011. Investment held for sale at US\$ 5,422,844 in 2010 represented the reclassified investment in the subsidiary AAC measured at fair value. The subsidiary was subsequently disposed of in 2011 accounting for 731% increase in cash and cash equivalents from US\$ 1,110,781 in 2006 to US\$ 9,232,995 in 2011.

Receivables and Prepayments increased by 656% from US\$ 82,578 in 2006 to US\$ 624,038 in 2010. Receivables mainly comprised of preference share dividends accrued on the investment in AAC. At the time of disposal in 2011, all the outstanding preference share interest on the investment in the subsidiary were paid, accounting for the decline in receivables & Prepayments by 737% from US\$ 624,038 in 2010 to US\$ 74,515 in the financial year 2011.

The Trust's Total Assets grew by 265% over the six year period, increasing from US\$ 2,610,923 in 2006 to US\$ 9,526,966 in June 2011.

Table 2: BALANCE SHEET (US\$)

	2010/11	2009/10	2008/09	2007/08	2006/07	2005/06
	USD\$	US\$	US\$	US\$	US\$	US\$
EQUITY & LIABILITIES						
Capital Reserve	-	7,846,831	7,846,831	6,729,330	5,102,269	1,575,592
Accumulated Fund	13,198,171	4,855,518	3,161,808	2,605,075	2,404,381	1,027,195
Currency Translation Reserve	(3,671,205)	(2,440,421)	(1,371,633)	699,003	442,971	8,136
TOTAL EQUITY & LIABILITIES	9,526,966	10,261,928	9,637,006	10,033,408	7,949,621	2,610,923
Non Current Assets						
Property and Equipment	63,091	28,347	43,779	67,127	67,634	77,063
Investment in subsidiary	-	-	6,998,126	7,374,622	4,812,351	-
Loans and Advances	293,521	277,457	277,653	207,475	194,921	1,392,470
	356,612	305,804	7,319,558	7,649,224	5,074,906	1,469,533
ASSETS						
Current Assets						
Investment Held for Sale	-	5,422,844	-	-	-	-
Receivables and Prepayments	74,515	624,038	475,007	340,211	159,345	82,578
Cash and Cash Equipments	9,232,995	3,931,164	1,860,889	2,071,063	2,749,071	1,110,781
	9,307,510	9,978,046	2,335,896	2,411,274	2,908,416	1,193,359
Current Liabilities						
Payables and Accrued Expenses	137,156	21,922	18,448	27,090	33,701	51,969
Net Current Assets	9,170,354	9,956,124	2,317,448	2,384,184	2,874,715	1,141,390
TOTAL ASSETS	9,526,966	10,261,928	9,637,006	10,033,408	7,949,621	2,610,923

Source: Audited Financial Reports 2006-2011

FORGING AHEAD WITH A NEW MANDATE

No longer a grant maker

In late 2010, the Trust took a bold decision to change its way of working from a grant maker to a specialised direct implementer and manager of programmes and projects in partnership with and/or on behalf of governments, international and regional organisations, and the private sector. The mandate of Kilimo Trust is to provide public funders, the private sector and other actors, an integrative platform for the scoping, designing and implementation of regional agricultural markets' programs.

The 'New' Kilimo Trust:

- *Is an African independent organization with a trust structure and focused only on regional agricultural markets as core business;*
- *Has a strong Board of Trustees with strong private sector representation and expertise of high calibre, integrity and independence;*
- *Is focused on staple food sub-sectors in the EAC with respect to potential for utilization of comparative advantages to expand trade;*
- *Has signed a MoU with the EAC Secretariat and working closely with relevant stakeholders to enhance agricultural markets in the EAC Region + South Sudan;*
- *Is partnering with the EAC Secretariat and FAO on a programme for accelerating agro-processing in the region – a very important component of enhanced agricultural trade; and*
- *Has set-up a fully fledged Division to lead its work in Diagnostics and Analysis of Opportunities and Constraints of major agricultural markets and relevant value chains, especially within the context of the East African Common Market.*

While the Vision remains the same, the Trust has taken-on a new **mission** to **catalyze the growth and competitiveness of strategic agricultural sectors for the benefit of a large number of people in East Africa**. The aim is to make the Eastern Africa Common Market work for the reduction of poverty

and elimination of hunger in the region. The Trust focuses on regional solutions to local problems in ways that contribute to developing strong regional value chains that enhance security of incomes, food and nutrition in the region. The Trust does this by:

- Implementing sector development programmes in response to market opportunities across the region;
- Providing thought leadership, through high level diagnostics and analysis to create, advance and share ideas – on EAC regional approaches to agriculture for wealth creation and food security;
- Providing leadership and hands-on implementation of programmes and projects on behalf of – and/or in partnership with governments, international and regional organizations and the private sector; and
- Promoting “regional thinking and actions” and “business mind-set” in the EAC with respect to food security.

Implementation of the new mandate is already underway

The Trust is implementing a comprehensive diagnostic and analytical work to determine regionally strategic commodities which can be competitive, benefit large numbers of people and where transformation and upgrading efforts have a realistic and high probability of success and delivery of significant positive impacts to a large number of people. It is expected that, this will lead to the development of a regional knowledge-base on key food commodities (crops and livestock) across the EAC to determine and agree with stakeholders on the most strategic commodities and priority areas of focus with interventions at regional scale – so as to “deliver the promise of the East Africa Common Market” with respect to reducing poverty and eliminating hunger. As part of this, starting the last quarter of 2012, Kilimo Trust (KT) is collaborating with Trade Mark East Africa (TMEA), to design a Regional Markets Development Programme. Kilimo Trust will be responsible for the agricultural markets component with an aim to produce full designs of

a Portfolio of Regional M4P Programmes for the EAC + South Sudan for regionally strategic staple food commodities, as well as non-food agricultural commodities with potential for regional trade.

M4P Programs Underway

A: DIMAT

Since October 2011, the Trust is part of a consortium implementing a four year project titled “Development of Inclusive Markets in Agriculture and Trade (DIMAT)” supported by UNDP and the Government of Uganda. The project is designed to build (i) Business Linkages to support producers and/or other agro-entrepreneurs organized as viable business entities to enter into contract arrangements with well established medium and large agribusinesses to enhance market access; (ii) Capacity of Smallholder Producer Groups and Business Associations to support producers and/or other agro-entrepreneurs to build thriving businesses that can participate effectively in value chains; and (iii) strong and win-win business partnerships between SMEs as downstream and/or upstream partners of large multinationals in agribusiness and allied sectors.

B: BEST-EAC

In October 2012, the Trust will launch its first regional agricultural markets programme titled “Bean Enterprises and Structured Trade in the EAC (BEST-EAC)”. The programme is targeting the smallholders as consumers and/or producers, with the Objective to “support consumer-driven markets and structured regional trade of beans and bean-food-products in the EAC” so as to enhance the leading role of beans in food and nutrition security, wealth creation and sustainable agriculture”. This will be pursued through four results:

IR1: Business Linkages for Regional Trade in Beans and Bean-food-products - operational;

IR2: Market-demanded Nutritious and Safe Bean-food-products – commercially available;

IR3: Optimal Post-harvest Handling and Value Addition Processing of Beans for Regional Trade; and

IR4: Organizational Capacity of KT as a Regional Platform for Food Security in the EAC - enhanced.

