ASARECA
Transforming Agriculture for Improved Livelihoods

Celebrating EAAPP

Farmers testify of improved incomes, food security and welfare

EAAPP at a glance

Started in 2009, EAAPP is promoting collaborative agricultural research for development and sharing research outcomes among member countries and beyond. Under the arrangement, the four member countries of Ethiopia, Kenya, Tanzania and Uganda provide leadership to others as Centres of Excellence in chosen commodities. The Centres ensure that outcomes from their work benefit the others. Kenya is the Centre of Excellence for dairy, Uganda for cassava, Ethiopia for wheat and Tanzania for rice.

EAAPP is one of the major initiatives in Africa contributing to the attainment of the Millennium Development Goal (MDG) of halving hunger and poverty by 2015 through sustained economic growth of about 6 percent annually. The goal of EAAPP is to increase agricultural productivity and competitiveness, farm incomes, reduce poverty and improve food security in Eastern Africa. This is in line with the New Partnership for Africa Development (NEPAD's) Comprehensive African Agricultural Development Program (CAADP's) vision to generate and sustain a corresponding growth rate to achieve the MDGs.

To achieve these goals, EAAPP is working to strengthen and upscale regional cooperation in generation of technology; enhance training and dissemination programs for identified priority commodities, and facilitate increased sharing of agricultural information, knowledge and technology, across the recipient's boundaries.

Over the last five years, EAAPP has been implementing initiatives to achieve its goal by increasing adoption of new varieties, breeds and management practices; increasing adoption of improved processing and handling methods by processors; increasing access to disseminated new technologies; increasing land area with seeds of improved cultivars; increasing the number of improved livestock breeds.

Contents

Unprecedented collaboration

Statement by ASARECA Interim Executive Secretary, **Prof Francis Wachira**

As the sub-regional organisation for Eastern and Central Africa, ASARECA has offered its experience and expertise spanning 20 years in coordinating regional agricultural research for development to facilitate sharing and spillovers of technologies and innovations during EAAPP Phase I.

As a coordinating body, ASARECA commissioned the Natural Resources Institute (NRI) of the University of Greenwich and the Africa Innovations Institute (AfrII) to conduct an end-of-project evaluation, including economic analysis and impact assessment of EAAPP Phase I. Below are a few highlights of achievements:

Regional specialization, collaboration

Average level of regional specialization and collaboration across the four countries was 63%, an increase of 53 percentage points above the baseline and exceeding targets (EAAPP M&E data). Twenty-nine regional research sub-projects have been initiated with high levels of country participation. Several sub-projects address value chain and marketing issues.

Training

Short and long-term training of research scientists has increased the capacity of Regional Centres of Excellence (RCoEs) in each country, most notably in Ethiopia. A total of 105 Masters students and 44 PhD candidates have been fully funded under the project. A further 50 students

have received partial funding from the project. There were significant improvements in capacity to conduct research, support dissemination and host regional research exchanges.

Knowledge sharing

The regional centres of excellence have developed 138 new technologies. Many are new varieties of cassava, rice, wheat and forage crops. Twenty-three new technologies have been disseminated across national boundaries including: two Tanzanian rice varieties released in Kenya and Uganda, and undergoing National Performance Trials (NPT) in Ethiopia; four clones of Napier grass from Kenya recommended for dissemination in Uganda; botanical seed of cassava with enhanced carotene sent to Ethiopia, Tanzania and Kenya; Assisted Reproductive Technologies (ART) from Kenya sent to the other countries.

138
Technologies generated through EAAPP

Adoption of new technologies

There has been increase in adoption of new varieties, breeds, and other selected management practices by farmers from 35 percent to 53 percent (2010-2014) in project areas. The proportion of beneficiaries using improved varieties of cassava, wheat and rice increased in all countries between 2009 and 2014. In 2014, 65 percent of targeted households were using improved cassava, improved rice varieties (87%) and improved wheat (97 %).

Increase in land area

Land planted with improved cultivars increased from about 2,755 ha in 2010, to 12,807 ha in 2014. This is attributed to the substantial increase in production of planting material and farmer awareness. Almost all technologies performed well over the current technologies applied at farm level, ranging from zero to 8% between 2010 and 2013.

Stakeholder satisfaction

Farmer satisfaction with technologies has increased from 23 percent to 69 percent of households in project areas. The beneficiaries are already seeing a positive impact from their involvement in the programme. Average yields for beneficiaries in 2014 were 15 tonnes per hectare for cassava, 7 for wheat and 9 for rice. These exceed regional productivity figures for rice and wheat.

Food security

Beneficiaries with household food surplus rose significantly in Ethiopia, Kenya and Tanzania, and slightly in Uganda. Nutrition security was significantly higher for project farmers compared to non-beneficiaries for wheat in Ethiopia and dairy in Uganda.

Testimonies by selected farmers in the four countries on pages….. explain this.

Breaking barriers

How countries shared innovations through EAAPP

Statement by Regional EAAPP Coordinator, **Vincent Akulumkua**

In January 2015, the Dairy Regional Centre of Excellence based in Kenya, gave Uganda national dairy programme 300 straws of high quality Ayshire breed semen.

According to Kenya's Director for Animal Production in the Ministry of Agriculture, Livestock and Fisheries, Mr. Julius Kiptarus, the Dairy Centre identified the Ayshire breed because of its potential to survive conditions that are common to the four EAAPP implementing countries. The globally reputed breed, from New Zealand, is known for high milk yields, tolerance to some diseases that are rampant in Africa, and flexibility in feeding habits. Besides, it can feed on many Ugandan livestock forage.

Elite semen shared with Uganda

The semen was given to the National Animal Genetic Resources Centre (NAGRIC) on behalf of the government of Uganda. NAGRIC is already using it to improve their stocks as part of the national high quality livestock-breeding programme. NAGRIC will also distribute some straws to elite farmers in Uganda as part of the first efforts to increase the number of farmers on the breed improvement initiatives. This is expected to eventually benefit more farmers.

This is only one of the many collaboration avenues and sharing deals that Uganda, Kenya, Tanzania and Ethiopia have been involved in over the last years, a relationship put in place through the Eastern Africa Agricultural Productivity Programme.

The World Bank, which is the main development partner in EAAPP, and ASARECA have been keen on cross-border learning. According to the Interim Executive Secretary, ASARECA, Prof. Francis Wachira, exchange of information, knowledge, technologies and innovations is an essential milestone of EAAPP. "EAAPP is about countries benefiting from each other," says Prof. Wachira.

Under the arrangement, a total of 128 researchers were brought together to carry out collaborative research in 33 regional projects on cassava (8), wheat (10), dairy (5) and rice (10). According to Mr. Vincent Akulumuka, EAAPP regional coordinator, as the region awaits formal harmonized policy instruments for exchange of research outputs, EAAPP is using country-to-country agreements, imports/export permits and Standard Material Transfer Agreements.

128
Researchers working together under EAAPP

Besides the semen, the Dairy Regional Centre of excellence has shared collections of improved Napier grass to Uganda and a livestock breed survey tool to Tanzania, while Kenya received descriptions of cross breeding practices for livestock from Uganda.

Nine Napier grass collections from Kenya are being tested in other EAAPP countries. So far, two out of nine are showing promising results and may be released and registered in Uganda.

Rice

The Rice Centre of Excellence has shared to Uganda, Kenya and Ethiopia four rice varieties TXD306, Tai, Komboka and Ziada, which were developed in Tanzania.

From these, Kenya has officially released two varieties (Komboka and TXD306), Uganda has released two (Komboka and Ziada) and Ethiopia has released one (TXD306) into their national seed release systems. This means that they can be available in the seed market very soon.

Cassava

The Cassava Centre of Excellence, led by Uganda, shared 159 Cassava germplasm to Ethiopia including botanical seed and botanical seed sprouting technique.

The sharing includes protocols for quality management for multiplying clean materials of cassava, which were shared to Kenya and Tanzania; virus diagnostic procedures shared to Tanzania and Kenya, and cassava-processing machines (chipper and graters) shared from Uganda to Tanzania.

Tanzania and Ethiopia EAAPP teams join colleagues from the Cassava Centre of Excellence to receive dairy breeding material from Kenya.

Cassava varieties from Uganda have also been shared to South Sudan, DR Congo and Kenya.

Meanwhile, Tanzania shared elite cassava materials tolerant to cassava brown streak disease to Uganda. Kenya also shared cassava processing machines (chippers and graters) to South Sudan.

Wheat

A total 951 lines of bread-wheat from Ethiopia are being tested in preliminary trials in Kenya and Uganda. Of these, 72 elite lines are in advanced trials in Kenya and Uganda.

Kenya shared its elite wheat variety (kingbird) to Ethiopia and is under seed multiplication for wider dissemination.

Cross border farm visits

EAAPP has been facilitating learning. For example, farmers from Kenya were facilitated to visit Tanzania to learn about rice innovations; Ugandan farmers visited Kenya to exchange knowledge and experience on dairy and pasture seed; Kenyan farmers visited India to get a glimpse of their sophisticated dairy technologies; while Ugandan farmers visited Ethiopia to learn what makes Ethiopia a leader in wheat production.

Farmers from Kenya and Uganda established a cross border innovation platform for cassava and other technologies at Busia border. As a result of sharing, there have been significant improvements in the production and marketing of the four commodities.

Collaboration up

According to ASARECA results framework, regional specialization and collaboration has grown from 10% before EAAPP to 76% in 2015.

This increase is attributed to more organized joint planning and implementation of agricultural research, training and dissemination activities among the partners. Overall, more land was dedicated to wheat, cassava and rice production.

Other countries have dedicated more land to expansion of the technologies for multiplication and sale. An average of 3.5% increase in new land acquisition has been noted in all the countries.

990

Metric tonnes of breeder seed produced under EAAPP

Research institutions have produced over 990 MT of breeder seeds and planting materials of selected commodities, and these have been availed to targeted groups for further multiplication and sale.

Over 3.8 million doses of livestock semen have been sold within the collaborating countries and beyond. Out of these, Tanzania produced 676,436 doses of semen, Ethiopia 63,416, Uganda 40,632 and Kenya, the regions leader, over 3 million. The number of breeding stock has also grown steadily, from 2,942 in 2010 to 5,119 in 2014.

EAAPP Phase II is very critical

Appeal for EAAPP Phase II by top African leaders

On August 4, 2014, leaders of the ministries of Agriculture, Livestock, Fisheries and Food Security from Ethiopia, Kenya, Tanzania and Uganda issued a joint communiqué passionately appealing for resources to implement EAAPP Phase II.

10
Number of years EAAPP was designed to last

Caucused to one voice by impressive achievements of EAAPP Phase I, the Ministry leaders during a regional steering meeting in Naivasha, Kenya, said, "The project is ready to expand vertically and horizontally by including neighbouring countries such as Rwanda, Burundi and the Democratic Republic of Congo and therefore contributing to greater regional integration in research and development and increased sharing of technologies, innovations, knowledge and information."

They noted that EAAPP Phase II was best suited to take advantage of the momentum created under Phase I to take regional agricultural research and development to unprecedented levels.

The leaders, who spoke on behalf of their countries were: Prof. Fred Segor, Principle Secretary State Department of Livestock, Ministry of Agriculture, Livestock and Fisheries, Kenya; Madame Sophia Kaduma, Permanent Secretary Ministry of Agriculture Animal Industries and Fisheries, Tanzania; Mr. Vincent Rubarema, Permanent Secretary Ministry of Agriculture, Animal Industries and Fisheries, Uganda; and Wondirad Mandero, State Minster, Ministry of Agriculture, Ethiopia.

They noted that the original design of EAAPP to is to last for 10 years, which is sufficient to trigger off significant productivity improvement and growth. Therefore, halting, or even fragmenting the transition to Phase II could seriously undermine achievements started to be seen in Phase II.

The leaders' statement comes after similar emotional and rational discourse across ASARECA region over the unprecedented pace of achievement under EAAPP I. The agricultural research and development community

Farmers in Kilombero, Tanzania have adopted planting rice in rows and regulating water provision.

argues that Phase II would allow for the implementation of policy harmonization frameworks at the country level to boost benefit sharing and collaboration; scaling-out of technologies generated in Phase I, and those to be generated in Phase II. The research and development elites see the second phase as ideal for deepening value addition agribusiness as part of the commercialization bid.

And given that the RCoEs invested heavily in developing institutional and human capacity, and generating technologies, these investments would become futile if the purpose for which they were put in place aborted. The over 138 technologies developed in EAAPP I, need to be and scaled out to the very demanding households.

It is therefore, a popular request that the World Bank leadership brings the funding of EAAPP II high on the Banks' priority list.

Testimonies by farmers and other value chain actors on pages 10 - 29, pages 36 - 41 and pages 46 - 49 of this book, illustrate that EAAPP is a mechanism that works.

How the DRCoE steered dairy revolution in EAAPP countries

Since EAAPP kicked off in 2009, Kenya, which is the Regional Dairy Regional Centre of Excellence (DRCoE), provided member countries leadership by generating and making available technologies, innovations and management practices (TIMPS) on dairy.

These include certified forage/pasture seeds and planting materials; appropriate dairy feeding systems (rations and ration formulation techniques); generating, multiplying and making available appropriate dairy germplasm (bulls, heifers, Does, Bucks, semen, embryos, camel replacement stock) etc.

The DRCoE is charged with operationalising appropriate dairy breeding systems; operationalising sustainable disease control innovations and strategies; formulating and harmonising viable and enabling policies and regulation options.

They are also responsible for developing improved products handling, processing and marketing technologies/approaches/strategies, developing and up-scaling appropriate dairy husbandry techniques; generating and share scientific information throughout the region; centralising evaluation of germplasm and conserving genetic materials across the region.

Regional approach

A regional pool of experts was assembled and they established guidelines for joint project reviews, impact assessment, packaging of information and technology for dissemination, capacity building needs, analysis of policy and regulations in the region and agree on a framework for harmonization.

ASARECA provided a platform for close collaboration between RCoEs. Kenya's Department of veterinary Services facilitated certification of 1,060 breeding dairy cows and dairy goats for export. Forty (40) in-calf dairy heifers were sold to Tanzania and fifty (50) to Burundi. Over 1000 live animals have been sold to Tanzania, Uganda and Rwanda in the last 2 years. Six (6) Napier clones/accessions tolerant to Smut and Stunt Disease were shared with Uganda.

A model Kenyan farmer shows-off his milk cow.

Nine dissemination pathways were used to share TIMPs both existing and new ones for uptake across the region.

These included; regional exchange visits, national performance trials, print media, East Africa Hand Book, website, conferences, exchange visits, regional exhibition and video conferencing. Exhibitions, trade fairs, shows and conferences were used as vehicles for regional technology dissemination.

Through these pathways, Kenya has shared crop residue utilization technology, forage suitability maps, improved pasture and fodder, pasture and fodder conservation technologies, assisted reproductive technology (Embryo Transfer), motorized seed dressing technology, wheat threshing technology and rice knowledge bank to the other countries in the region.

Coverage in Kenya

EAAPP is operating in 33 cluster sub-counties including four government farms, seven cluster sub-counties for dairy, six for wheat, five or rice and, eight for cassava. About 61% % of the farmers in the dairy clusters have adopted improved dairy breeds comprising mainly Ayrshires and Friesians due to capacity building and trainings. Support to Artificial Insemination (AI) services

The 200-seater resource centre at the Dairy Regional Centre of Excellence in KALRO Naivasha, Kenya.

has resulted into adoption of improved breeds for increased milk production.

The area under improved pastures increased from 193ha to 462 ha over the project period, which represents 140% increase. Milk productivity increased from 7 to 11Kgs/cow/day in dairy cattle in the project sub counties, which can be attributed to major interventions in feeding directed towards cattle milk production.

200
Conference sitting capacity of the resource centre

Pasture productivity has increased from 8.4 to 12.5 tons per acre over the project period. This is because more farmers have adopted improved pasture production, pasture and fodder conservation, crop residues utilization and feeds formulation among other husbandry practices after the farmers' trainings.

The impacts of these foundation initiatives are illustrated by testimonies of initial benefits by the farmers on pages.

Infrastructure development

The focus of infrastructure development is to build the capacity for research and development. The construction of Resource Centre, Milk Processing Unit, Garage and Namanga Quarantine Station is almost at completion stages. This is expected to provide impetus for dairy excellence capacity development. For example, the 200-seater conference Hall at KALRO Naivasha, the fulcrum of dairy excellence is ready for commissioning. It has two seminar rooms with seating capacities of 50 and 70 people, a kitchen for the total population, a dining hall and lounge, a 1000 sq feet technology shop, an office, three rooms for the differently abled and a gym.

Semen distribution centres established

To decentralize liquid nitrogen production and distribution of semen to enhance availability and accessibility in three dairy producing areas, three liquid nitrogen plants are at advanced stages of procurement process.

A milk processing plant at KALRO Naivasha, Kenya.

Three housing units for the plants are near completion in government farms in Nyandarua, Uasin Gishu and Meru counties.

Milk processing equipment

Assorted milk processing equipment such as milk coolers, pasteurizers, milking machines, milk analyzers, ice cream machines, yoghurt and cheese machines were procured and distributed to various farmers' groups as part of capacity development.

Laboratory equipment

Assorted laboratory equipment was bought to furnish the dairy laboratory at KALRO Naivasha. These include, two (2) laboratory incubators, somatic cell counter, water distiller, bomb calorimeter, spectrophotometer and one (1) digital cold chamber and high performance thin layer chromatography machine. The laboratory is currently benefiting a PhD student from Ethiopia. Candidate funded through EAAPP. "Training and capacity building for PhD and Masters candidates is critical in enabling the centres of excellence sustain their excellence," says Dr Tobias Onyango, the coordinator of the Dairy Regional Centre of Excellence (DRCoE). "The centre provides services to farmers, farmer groups, makers of dairy feeds, and university students, to mention the least"

Ten demonstrations on dairy cattle feeding were conducted in cluster districts to expose farmers to various technologies including; pasture and fodder establishment, pulverization, feed formulation, feed conservation, disease control, breeding, clean milk production, zero grazing and value addition among others.

The project also promoted of assisted reproductive technologies along with policy harmonization to enhance livestock germplasm trade, as well as improving the capacity of seed and dairy germplasm multipliers and traders through training and business support. Some of the initiatives supported include germplasm improvement programmes, semen production and supply, and promotion of assisted reproductive technologies (ART); and support to artificial insemination using sexed semen.

Dairy empowerment via Oljoro Orok

The abbreviation TMR, sounds like technical jargon to most farmers anywhere in Africa. True—but not to dairy farmers under EAAPP support in Kenya. The abbreviation for Total Mixed Ration, is daily speak to hundreds of farmers in the counties of Nyandarua, Nyeri, Mukenga and Nakuru, which are some of the top destinations for dairy farming in Kenya. These are some of the areas where EAAPP has been promoting dairy farming technologies and best practices. They use this word and live by it. The result? Their lives have been turned round.

This critical mass of farmers is a product of five years of concerted efforts by the Dairy Regional Centre of Excellence.

An attendant weeds the protein loaded Vetch at KALRO Oljoro Orok.

Through KALRO Oljoro Orok, the centre generated and made available certified forage/pasture seeds and planting materials; appropriate dairy feeding systems (rations and ration formulation techniques) along with appropriate dairy husbandry techniques among others.

Naftali Kanegeni displays Tree Lucerne seedling.

According to Naftali Kanegeni, the officer in charge KALRO Oljoro Orok, feeding is a major challenge in livestock industry, especially dairy livestock, yet feeding is the bedrock of dairy farming. For this reason, KALRO Oljoro Orok provided the region leadership in generating, establishing and providing information and capacity building in livestock feeding.

"We have provided expertise and leadership in planting materials for fodder and pastures. As leaders, we have been producing high quality materials, providing them to farmers in Kenya, and making information on our innovations available to the dairy fraternity in the EAAPP countries," says Kanegeni.

Oljoro Orok sells research established high quality materials mainly as seed to farmers. "We have packed our interaction such that farmers are trained on how to establish their own fodder and grasses and how to process/mix the food rations," notes Kanegeni.

The centre also provides, sexed semen, artificial insemination services and capacity support. The centre has initiated activities to decentralize artificial insemination services through participating and organized farmer groups, an initiative partly facilitated by the liquid nitrogen plants established and due to be completed in about 5 counties.

Some of the feed varieties established at Oljoro Orok and disseminated to farmers include head smut resistant varieties of Nappier grass (Kakamega 1 and Kakamega 2; protein rich climber legume vetch; protein efficient sweet lupins; fodder tree Lucian; protein rich sweet potato vines; protein rich desmodium; and oat, a great substitute to Nappier.

The importance of these feeds to farmers are illustrated in testimonies on pages 10 - 29

A milker at Cyrus Maniki Mwangi's farm in Nyandarua, Kenya

Testimonies
Kenya





Tulaga Farmers Marketing Cooperative, Nyandarua county,Kenya

Bonus cheques, health insurance:
Farmers upbeat by dairy benefits

The over 2,000 members of Tulaga farmers marketing Cooperative Limited in Nyandarua county in Kenya receive bonus cheques from the cooperative at the end of every year. In 2014, for example, farmers who performed well in terms of stock supply received up to Kshs 25,000 (US$250). The cooperative has also negotiated a low interest credit facility of 12 percent with the Kenya Livestock Finance Trust Bank, instead of the 18% commercial rate. "Two years from now, we will start paying dividends to member farmers. Currently we guarantee loans for members in their respective banks, by acting as collateral," says Ms. Milicah Thiongo, the manager.

"We also pay national medical insurance of about Kshs 500 per family month on behalf of the members. It is later deducted from their member's cash account. The cooperative is so profitable that members are enjoying the benefits of being apart of it."

Tulaga farmers marketing Cooperative is one of the early beneficiaries of EAAPP. Although the cooperative existed long before EAAPP, the day they started engaging with the Dairy Regional Centre of Excellence (DRCoE)in 2012, the course of its development changed.

The DRCoE through KALRO Oljoro Orok provided the

Workers process TMR feed in Tulaga, Kenya.

A supply shop for Tulaga Cooperative members.

Some of the feeds at Tulaga Cooperative stores.

21,000
Litres of milk collected by the farmer's co-op daily

cooperative initial fodder seed with technical support to establish and conserve high quality feedstock. This came with training on entrepreneurship and agribusiness. The project also supported the construction of biogas digester, provided vaccination services against identified diseases. EAAPP also provided the cooperative a pulverizer (for grinding pasture into small particles) and facilitated member to attend field tours, exhibitions and conferences for exposure.

"Through EAAPP, we visited Githuguri, an advanced dairy farm in Kenya, where we learnt about fodder preservation and zero grazing " says Joseph Runana Muchai, a beneficiary. "Due to the overwhelming support, the cooperative currently produces between 14,000 to 21,000 litres of milk a day. We employ 44 staff directly (29 male and 15 female)." Started for joint marketing, the cooperative collects and bulks milk from the members, retains some for value addition and sells excess to advanced milk processors such as Brookside Dairies, the national leader. EAAPP also contributed Kshs 1,678,325 (US$1,6783.25) towards the construction of a feed mill to promote the total mixed ration (TMR).

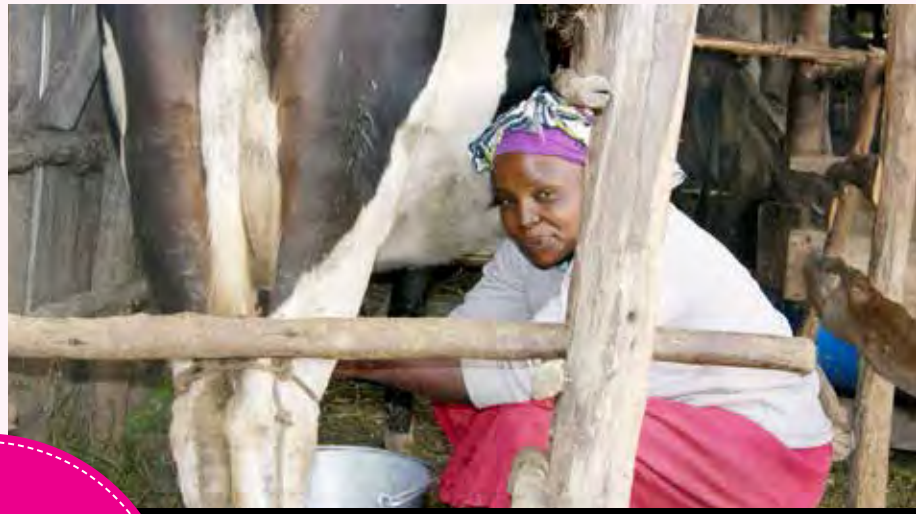
This motivated other players such as the county government to contribute towards mill. The mill is crucial in closing the gap for quality feeds created by the proliferation of substandard feeds from commercial suppliers. "We now have the capacity to mill and package eighty (80)-70kg bags of TMR feed meal comprising cotton seed, bone meal, limestone, pollard from wheat, maize, premix, yeast culture, molasses, soya seed, soya cake, maize grain, micotoxin binder daily," says Thiongo. "Calculated at a selling price of Kshs 2,150 (US$21.5) per bag, the cooperative earns about Kshs 150,000 (US$1,500) per day from feed meal alone."

Muchai and his wife, Nancy Waithiri, Nyandarua county, Kenya

From 20 to 80 litres of milk daily

"Before I came face to face with EAAPP, I was milking only 20 litres a day from three cows. When my cooperative (Tulaga) linked me to EAAPP, I gained lots of skills in zero grazing and proper feeding of dairy cattle.

I learnt about TMR and how to establish my own fodders and grass. EAAPP also sponsored me for a learning trip to Githuguri and Mukuraine farms, which are very advanced in dairy. I have gained confidence in dairy farming and today I get 80 litres of milk from three cows. EAAPP provided me sexed semen, from which I got two additional Friesian cows. My dairy herd has grown to nine. We have benefited a lot as a family. We have built a newly improved kitchen, which we power using biogas. We are able to pay school fees for all our four school going children," says Joseph Runana Muchai.



Nancy Waithiri milking her favourite cow.

80
Milk output that the family gets daily

Muchai and his wife, Nancy Waithiri are an example of successful farmers in Nyandarua county in Kenya, who belong to (Tulaga scheme) that EAAPP has modeled to promote innovations and best practices to improve dairy farming and incomes of farmers.

Farmers in this location received training and a range of expert and extension services on livestock upgrading, establishing and conservation of fodder, silage making, balling and building hay storage facilities and making TMR, agribusiness and vaccination etc. These farmers are all reporting increased production and improved income and welfare. Before EAAPP, Joseph and farmers like him did all sorts of things without stopping to consider, where there competitiveness lay. After seeing the benefits of zero grazing, they have opted to grow be self sustaining dairy farmers, growing feeds such as dat, maize, pupple vetch, Lusan, Lupin and double bean. All these are legumes, which are high in protein content. Their success in being replicated by their peers. "Four families in the neigbourhood have picked up the best practices from us," says Muchai.

John Tanui and wife Rita Kibiego, Elgeyo Marakwet county

Over 200 farmers visit model farmer Tanui annually

EAAPP identified Mr John Tanui and his wife Rita Kibiego from Keiyo South, Kapchemutwo ward in Elgeyo Marakwet county as potential impact causing agents in 2012.

The dairy ReCoe provided them training on pasture establishment and conservation and initial pasture seed for lupins, desmodium and sunflower among others. They were also supported to establish a zero grazing unit among other things. From this, The Tanui family boasts of 1 ½ acres of Boma Rhodes grass,which is intercropped with protein loaded desmodium; 1 ½ acres of Nappier grass and one acre of maize for fodder. This, he uses to feed four high quality freesia cows and one Aryshire breed.

John Tanui shows-off Boma Rhodes.

"We are currently milking 2 cows which give us 40 litres per day (about Kshs 60,000 per month). In the last two years, I sold two Friesian cows at Kshs 70,000 each, earning about Kshs 140,000. In the same year, I earned Kshs 75,000 from Boma Rhodes seed alone," says Tanui.

He has in turn trained over 200 farmers a year from as far away as Pokot and Marakwet who visited see learn about feed formulation, tick control, animal registration, clean milk production. Research and extension also use this farm to host training for other dairy farmers.

Umoja Dairy Farmers Society, Nyandarua, Kenya

Milk contamination contained, value addition up

Since the Dairy Regional Centre of Excellence reached out to Umoja dairy society in 2012, milk contamination has been reduced drastically. The volume of value added products has also expanded exponentially. "Previously we were suing energy saving deepers to paturalise milk. The process was painfully slow. We could afford to pasteurize only 100 litres into yoghurt a day. The shelf life of the yoghurt was only 7 days," says the group chairman and model farmer Cyrus, Maniki, Mwangi.

1,500
Litres of milk that the farmer's group can paturalise daily

Then EAAPP provided the cooperative a pasteurizer with a capacity to do 1500 litres a day and a milk analyser machine for safety. "Contamination has been contained almost to zero," says Mwangi. "The shelf life for yoghurt is now 24-28 days." The cooperative now collects between 1,700 to 3,000 litres a day, and processes about 500 litres. The rest is sold to Brookside Dairy, the milk processing power in Kenya.

A value added sales van for Umoja farmers.

A milk cooling plant at Umoja Dairy Farmers processing unit in Nyandarua, Kenya.

Like other cooperatives and organized farmer groups, the Dairy Regional Centre of Excellence helped to provide basic start up infrastructure, technology intervention facilities for processing and value addition, training on feed rations, and technical backstopping.

This process included exposure to the way the established farms are doing things through field visits, facilitation to exhibitions etc. Umoja was started in 2012 by farmers to address the challenge of post harvest loses and marketing. Today a total of 112 group member farmers are using TMR and have a functional feed store for TMR. "Group members are able to access high quality feeds and have been able to increase density of milk, which implies higher quality," says Mwangi.

Youth group earns big, creates jobs, live cozy lives, impacts other youth

Mindiliwo Development Youth Group and livestock feed centre in Elgeyo Marakwet County in Eldoret Kenya, earns about Kshs 96,096 a month, which means a gross profit of Kshs 28,028 and a net profit of Kshs19,028 monthly. This is after deducting costs for salaries and lunch allowance for permanently employed staff. This money comes from sales of 4,004 kg of TMR per day."We have established an MPESA (mobile money transaction stall) at the food store to keep it optimally operational," says Mohamed Kibiwot Serem, the chairman of the group.

Mohamed Kibiwot Serem and Mindiliwo employee display TMR feeds

"Every member is food secure. We are recognized by leaders, politicians, and are the first point of reference. Our children are getting quality education in private schools. All members of the group have electricity in their houses. Some have biogas facilities."

Besides, most of the 15 members (8 female and 7 male) are upgrading their education. So far, two have enrolled

Some members of the youth group in-front of their stall.

at various universities and others in colleges. According to Kibiwot, in the next two or three years, the members will start earning dividends. For now, they ensure that member access soft unsecured loans from scheme to further individual projects through table banking.

"We have pool cash of Kshs 72,000 from which members can borrow and pay at an interest rate 10% per month," he explains. Seeing that the youth are focused and visionary, the Uganda Women's Effort to Save Orphans (UWESO), an NGO, has provided the group an additional Kshs 200,000 towards enlarging the feed store and expanding operations.

EAAPP looped in this group comprising mainly form Four and college leavers in 2012 as part of the bigger initiative to engender agricultural development through the youth. "The DRCoE provided us initial raw materials to formulate TMR comprising cotton seed cake, maize brand, sunflower seed, wheat brand and a pulverizer for milling feeds, a spray pump and feed mixer with capacity of 400Kgs in 10 minutes,' says Kibiwot.

Ksh19,028
Net profit earned by youth group from feeds sales

In addition, the youth got training on dairy feeding using TMR, pasture establishment and management. This came with initial feed materials from Ojoro Orok. EAAPP also provided training on farming as a business, group dynamics and governance. Following this training, the founding members opted to stay out of the daily running of the business.

Formed in 2011 to help the youth use collective action to overcome financial, constrains and mobilise them against risky behavior, the group initially bought a dairy cow for each member from proceeds of joint casual labour.

With time, they were able to produce milk but lacked market, so they started a milk bank with two milk cans, a sourcepan, boiler and test kits. While the demand for milk was high, they experienced losses due to handling and feeding challenges. EAAPP came in handy.

"Today, we sell some of the best quality feeds formulated in strict adherence to research recommendations. We also provide the wider community services such as animal drugs, professional artificial insemination, tick control and bulking of milk. We went into feed processing to close the gap of poor quality and in availability of feeds. This initiative is being replicated in all counties to create empowerment and employment to the youth," says Kibiwot. As a shinning example, this group has led to the formation of two other youth groups who are now benchmarking on their practices.

Mindiliwo Development Youth Group, Eldoret, Kenya

Youth excited by cash, fame, electricity and biogas in village homes

In a village setting 600 miles away from the capital Nairobi, Karui's and his wife, Doris both members of the youth group are a happy couple. Doris uses a biogas stove.

"We have been able to connect electricity from the national grid and generate additional power from biogas because of earnings from milk. Every month we get Kshs 30,000 from milk alone," she says.

"We are also able to pays school fees for our child at a private school." In addition to a cow secured from the group, Doris and husband received sexed semen from EAAPP. This gave them their second and third cows. With this, they were able to grow the herd to five.

"Feeding them is not a problem now because we have planted lupins and pomarods for proteins in addition to other feeds. We also conserve feeds and supplement them with meal bought from the youth feed shop," says Karui. This young couple could represent happy voices of other youth in the group who more or less are in the same level of development.

Doris (above) cooks using a gas stove. Her husband, Karui, shows -off vetch.

From 2 to 18 Friesian cows

"From the sale of genes for heifers and bulls alone, I earn Ksh180,000 a year. From milk I raise over Kshs 30,000 as clean profit," Cyrus Maniki Mwangi, a model farmer and chairman of Umoja group in Kenya, says.

Cyrus Maniki Mwangi feeds his heifers at Nyandarua, Kenya

By selling genes he refers to income from selling excess animals with high dairy production traits that he has been propagating through skills, semen, husbandry and monitoring guidelines provided to him by the DRCoE.

"For sustainability, we are growing the source of breeding materials by grooming model farmers to become suppliers. We have trained them to know the history of their dairy cows and bulls so as to track the breed and its performance," Dougls Indetie, the scientist at EAAPP Project Coordination Unit explains. "After every 5th lactation, I sell a cow or bull to other farmers who desire to venture into zero grazing," say Mwaniki. He started with 2 Friesians cows and attained a stock of 18 in 2014.

He, however, reduced the numbers to seven. "I was advised by EAAPP to keep an economically cost effective number, which I can feed efficiently," he explains. "Now I am maintaining 2 heifers and 5 mothers. Four of them are milking and producing over 100 litres of milk a day."

EAAPP also uses this farm to bring many more on board. Following best practices, Mwaniki has established one (1)acre each of columbus and Nappier, Boma Rhodes grass and 1 acre of Desmodium. Besides, he has ¼ acres of Lucern, 3 acres of silleage for TMR.

Dairy goats in densely populated areas

Nelly Biwot, a proud model farmer in Kokwao location in Emsoo Ward, Elgeyo Marakwet County owns 10 dairy goats (7 does and 3 bucks). She earns through the sale of milk, which attracts premium prices compared to milk from cattle.

"I am currently milking three goats and each yields 3 litres per day, which is about 10 litres per day for three goats. At Ksh100 per litre, I get 1000 per day or 30,000 per month… but the big money comes from the sale of genes," she explains.

Each female goat is sold at Ksh15,000 and the bucks go Ksh9,000 per buck. "I am not yet selling because I am still building the stock of females to create a big gene bank…when I start selling the stream of income will not dry up because many of the goats produce twins. I am capable of getting up to eight kids in a year."

Ksh19,028
Net profit earned by youth group from feeds sales

Biwot is a member of Kiba group that EAAPP is encouraging to remain productive despite high population pressure. In addition to initially providing them initial seed of lupins, desmodium and bomarods to multiply, two male goats for breeding along with artificial insemination facilitation, the DRCoE trained the group of 25 members (16 women and 9 men) on feed formulation and silage making.

They also received iron sheets and technical backstopping to establish Zero grazing units and hand sprayers. Since then, the goat stork in this location has grown tremendously from on 30 dairy goats in 2009 to 300 goats. Fifty (50) of the goats are upgraded local breeds and 250 are the Kenya Alphine breed a cross between, the local and the German Alpine.