Contribution of ASARECA and NaLIRRI to food security and household income in smallholder crop-livestock systems in Masaka and Ngora districts Uganda: Success stories

Participatory testing of drought tolerant forage species

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Introduction

Agriculture continues to be critical for rural poverty reduction, employment, economic growth and food security in Eastern and Central Africa (ECA). Despite a perception that ECA is an urbanized region, roughly one third to one half of people still live in rural areas. Agricultural production, processing, and related services remain an important source of income in many ECA countries. However, the agricultural sector is highly climate sensitive and potential adverse changes in temperature, precipitation and the frequency of extreme events (for example, droughts, heat waves, floods, forest fires) as a result of climate change are likely to increase the vulnerability of poor rural communities. This will place a strain on institutions, food supply and rural growth. This risk is further exacerbated by the relatively low productivity associated with a lack of capacity to adapt to the present climate in many ECA countries, resulting in an adaptation

deficit. In addition, even for farmers in countries that have the potential to benefit from climate change in the future, many are poorly positioned to take full advantage of such opportunities, unless investments and policy changes are implemented.

In view of the above challenges, ASARECA and the National Livestock Resources Research Institute (NaLIRRI) implemented (2011-2013) a project "*Harnessing crop-livestock integration to enhance food security and livelihoods resilience to effects of climate change in Eastern and Central Africa (LFP 12)*" to enhance productivity and competitiveness of integrated smallholder crop-livestock systems in Uganda through the promotion of market oriented integrated smallholder dairy and vegetable production units while developing gender responsive innovations to boost their resilience to the effects of climate change and variability. This document summarizes farmers' experiences in testing climate smart agriculture technologies and innovations in Masaka and Ngora districts of Uganda.

What is climate-smart agriculture?

Agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes greenhouse gases (mitigation), and enhances achievement of national food security and development goals.

Description of study sites

Masaka district

Masaka district is situated about 37kms. away from the Equator towards the south and lies between 0^0 25^0 South and 32^0 East, having an average altitude of 1,150 m above sea level (Figure 1). The District has a total land area of about 4560.4sq. kms. The annual average rainfall is 800-1,000 mm with 100-120 rainy days, in two seasons. The bi-modal rainfall seasons are March – May and September to November. Mean temperature ranges between 16^0C and 30^0C, while relative humidity is 62.1%. The district is typically dependent on crop-livestock systems. The soil texture is ranges from red-latrine, sandy loan and loam but in general, productive. The total geographical area of the district is about 6986 sq. kms out of which 5865 sq. kms is arable and 122,120 hectares are under cultivation considerable area is covered by marshlands, lakes, rivers, forestry and swamps. The total gazetted forest estate is about 35302 hectares this constitutes about 6.38% of the total land area of the district.

Ngora district

Ngora District was established on 1st July 2010 by the Ugandan Parliament. Before that it was part of Kumi District. The district lies at an altitude of between 1,036 and 1,127 meters above sea level. According to UBOS (2008), the estimated population of Ngora District was 356,500. This population is mainly rural with about 5% characterized as urban population.

Average rainfall ranges between 1000 mm and 1500 mm coming in two seasons: March–May and September–November. There is a short dry spell between the two rain seasons during mid-

June–mid July. The long dry season sets in during late November through early March. The distribution is such that areas bordering Northeast experience earlier dry seasons. The vegetation in Ngora district is characterized by wooded savannah, short-grass savannah, forests and short grassland that is ideal for grazing.

Mixed agriculture is practiced, with cultivation by oxen as the main agricultural technology and livestock kept extensively in those areas that are tsetse-fly free. The main crops grown include; millet, groundnuts, sorghum, rice, cowpea, and soybeans, which are predominantly intercropped. Other crops include potatoes, cassava, sunflower and bananas with cotton as the major cash crop.

Figure 1: Map of Uganda showing location of Ngora and Masaka districts

A. Farmers' success stories in Masaka district

1. Nakayiki Rose, Chairperson, Butale Balunzi Balunzi Twegatte Group, Butale village, Bukoto sub-county, Kabonera

Ms. Nakayiki is involved in vegetable growing, zero grazing. Before NaLIRRI-ASARECA project, group members used to suffer losses due to long droughts, lack of markets for their vegetables, and milk. The quality and quantity of milk was low. The group acquired a solar dryer, under-ground water tank and treadle pump for irrigation of vegetables and watering animals, pasture seed, (lablab), training on ghee processing and group dynamics and saving .

Benefits

The group members process and sell their vegetables at competitive prices

M/s Nakayiki displaying some of the packed vegetables dried that solar drier.

With improved animal feeding, the quality and quantity of milk has increased and the group has a milk collection centre, market their milk as a group which earns them higher profits. With increased vegetable and milk production, nutrition has improved in the families and the income from the sale of milk and vegetables has helped them educate their children. Also income generated has also been used to start a saving scheme among the group where members are allowed to borrow at a very low interest.

Nakayiki's 2 year old grandson enjoying a cup of milk. The milk is from her animals

"I received this boy when he was 2 months old, but because I had enough milk in the house I was able to raise him without breast feeding from the mother" say Ms. Nakayiki.

2. **Stephine Korry a neighbour to Nakayiki also belongs to this group (Butale Balumi Balunzi Twegate)**

Ms. Korry with her cow

Ms. Stephine Korry has been practicing zero grazing since 1999. She received the first in-calf cow from the World Vision. She received pasture seed from the NaLIRRI-ASARECA project and planted on one acre. With improved pastures, milk production has increased by two litres. She has also gained from animal manure which she applies on her vegetables for better yields. This has enabled her earn money to educate her children and has improved nutrition in her family and is able to supply milk to breast feeding mothers in her neighborhood. She has a nursery school and pupils with their teachers benefit from the milk she produces.

"I appreciate the intervention by NARO-ASAARECA project by providing pasture seeds and I plan to expand my plots to produce more pastures for conservation" says Ms. Stephine.

3. **Ms Jeninah Katende of Kasenyi village belongs is also a member of Butale Balimi Balunzi Farmers Group**

She used to feed her cow on elephant (Napier) grass alone, the animal was not getting adequate feeding and was yielding very low milk. Her group was trained in better animal feeding and the project provided them with pasture seed for planting and multiplication. When she started feeding her cow on improved pastures, the cow's health improved and her milk production gradually increased from 5 litres to 12 litres per day. This was noticed by her neighbours who have since started their own pasture plots with seed from her. Her challenge now is the low supply of pasture seed due to heavy demand from the village mates who have realized the benefit of improved pastures. She has managed to give out to a few farmers.

"My request to the project is to avail us with more pasture seed which we can share with non-group members who have resorted on stealing our pastures" says Ms. Katende

4. **Ms Nakanjako Janet of Taga-Kasana, Kingo subcounty in Masaka district**

She received a zero grazing cow from MAADO. Initially she was using a matchet (panga) to chop elephant grass for her cow. There was a lot of wastage of the grass and very often the panga would cut her fingers in the process of chopping grass for the animal.

The project provided her with a **fixed knife forage chopper** andher group was trained in making hay from *Brachiaria mulato* and forage conservation for dry season feeding.


The project has trained farmers in dry season feeding including hay making and fodder banks

The forage chopper has made work easier, and enabled maximum food utilisationThe group was also provided with an underground water tank for the animals and home use.

Manure from the animals has improved on food production. The farmer has benefitted from various training from project staff. She encourages other farmers to come and learn from her group members so that they too can benefit.

"*A number of us in my group have improved on our incomes and we are sending our children to secondary schools for better education*" says Ms. Nakanjako

5. **Emanuel Bukenya,** a farmer/Trainer from Kakunyu village, Masaka District got a zero grazing cow from Kulika Trust for Sustainable Agriculture.

Before the project, he was experiencing problems with feeding the animal.The project trained him and his group of 50 members (Kakunyu Farmer's Group) in animal nutrition (including mineral block making) and better animal husbandry. He received and planted Brachiaria planting materials from the project. His animal now feeds on high quality feeds consisting of a mixture of feeds and legumes.The farmer has realized increased milk production from 5 litres to 8 litres due to improved feeding.He has also noted that good animal feeding enables the animal "get on heat" earlier.The increased milk production has improved his income and family food wellbeing.Mr Bukenya is now a **Key Farmer Trainer** (KFT) in Kikunyu village and has so far trained and provided fodder seed to over 45 farmers in the neighboring g villages in animal feeding, milk handling and general cattle management.

6. **Mr. Mayanja Leonard/Immaculate**, Kyabbogo-Nkoni, Kingo, Lwengo District

The couple belongs to Bulimutaka Women's Group affiliated to Send a Cow and are both farmer trainers. Mrs Mayanja is a **Peer Farmer** and trains farmers in vegetable growing and organic

agriculture. Her husband, Mr Mayanja Leonard trains farmers in cheap ways of water harvesting using underground tanks.

Mr. and Mrs. Mayanja's surface run-off water harvesting tank

The project discovered that the couple was already harvesting water from surface run-off and decided to contract them to construct more tanks in Bukulula, Kabonera, Taga ,Kitenga, Kikunyu. Many farmers are now using the dams to irrigate coffee, home use and for livestock. The couple has so far trained over 30 groups some with a membership of over 35 farmers in water harvesting for coffee production, organic vegetable production and marketing.

"*We very proud because of the publicity we have gained through working with the project, we sometimes receive phone calls from people informing us that they watched us on television*" says Mr. Mayanja

7. **Mr. and Mrs. Daaki Peter,** Kitenga village-Kalagala,Mukungwe, Masaka district a member of Akamira Eyiye

Mr Daaki, a retired teacher started practicing zero grazing in 1989 with one local cow which he later exchanged for a Friesian calf. He received training on zero grazing from several NGOs including World Vision, MAADO but still experienced the problem of poor feeding for the animals due to inadequate forage lack of knowledge on fodder preservation.

Project interventions:

The family has received training on aspects dairy and vegetable production; forage seed (Centrocema, Brachiaria, Napier grass that is tolerant to Napier stunt disease and desmodium), underground water tank and treadle pump, a forage chopper and vegetable seeds.


Mr. Daaki's fodder bank of Napier grass intercropped with forage legumes (left) and Daaki weighing Brachiaria fodder from his field

Mr. Daaki and a small boy demonstrating the use of forage chopper.

Benefits

The family has been able to improve household income and nutrition. Mrs. Daaki testified that she earns over Shs 120,000 from a 12 x 30 ft vegetable garden which she produces throughout the year because the family has water for irrigation and applies animal manure. The vegetables are a boost to nutrition in the family.


Mrs. Daaki in her vegetable garden (left) and drying fruits (right)

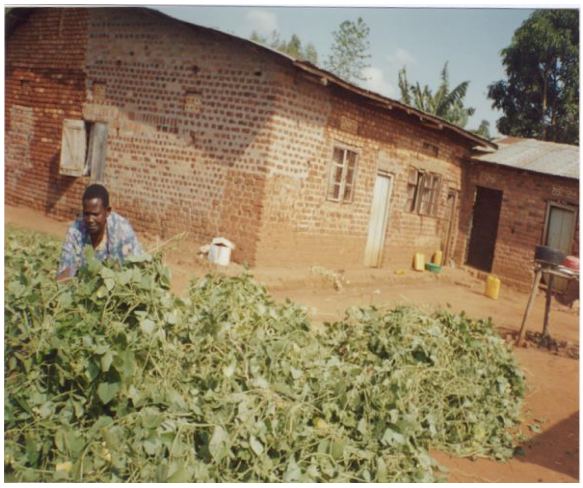
With a treadle pump, watering animals is now easier, and her vegetable garden.

The farmer has been trained in making multinutrient mineral blocks which he sells to other zero grazers. He is also doing hay and silage conservation. From the animal wastes the farmer is able to set up a biogas plant which provides energy for cooking and lighting. He has constructed a descent house. The income has also helped him educated his children up to University and other institutions of higher learning (3 graduates). He has used acquired income to start other projects e.g. poultry

Capacity building

The local community have appreciated and adopted the technologies especially silage and hay making and storage. Local communities have received and multiplied fodder seed supplied by the farmer thus improving on the local community. He has trained over 100 farmers from the neighboring districts some as far as Mbarara and Bushenyi. The family has gained a lot of publicity in newspaper, magazines (Uganda @ 50 published by monitor), and Television

programmes. This has been attributed to their excellent work. The family has been able to renovate their house.



Mr. and Mrs. Daaki's old house

Mr.and Mrs. Daaki's renovated house with a water tank

8. **Ms Agnes Kagimu** of Akamira Eyiye Farmers's Group, Kitenga village – Kalagala,Mukungwe-Masaka

Technologies adopted: Drip irrigation for vegetables.

She has regular supply of vegetables for the market and earns over Shs 60,000 which enables her to cater for her basic needs like paraffin, soap, scholastic materials for the children and medical treatment. She encourages other women to take up the activity as a source of income.

Challenges

(a) The groups received training on ghee production but were unable to produce ghee due to low fat content of the milk.
(b) Pineapple drying has not been successful because its takes a longer time
(c) Packaging and labelling of their products needs to be improved if they are to penetrate local and regional markets.

Observations

More irrigation needed to increase vegetable production. Gobe, carrots,cabbage and katunkuma are most popular with the farmers therefore more seeds are required to expand on production. Farmers expressed need for Training on Yogurt making,

9. **Mrs. Mary Lwanyaga, Kitenga village**

Mrs. Lwanyaga said that she has improved income through vegetable production. She benefited from water harvesting and is able to produce vegetables throughout the year through irrigation and manure application.

Mrs. Lwanyaga irrigating her vegetable garden

Group interviews

10. **Butale Balunzi Balimi Twegate Group** is located in Butale-Bukoto in Masaka district. It has a membership of 12 members. The group received the following technologies from NaLIRRI-ASARECA project: improved pasture seeds, vegetable seeds and solar dryers, and training in savings.

The group members had earlier received Dairy cows from Masaka Diocesan Development Organization (MADDO) with an exception one member who benefited from The World Vision. They admitted to have faced challenges of feed resources (pastures) and water availability for domestic use and giving their animals.

The technologies and knowledge provided by the project has significantly improved their livelihoods of the group members and their community. Working in a group has helped them sell their milk collectively to fetch better prices. They sell their milk to Masaka town. They have also enjoyed a lot of publicity in the media and they are always invited to exhibit their products (dried vegetables especially) on various exhibitions recently being UMA-show in Jinja. They are already planning to participate in another Uganda Manufacturers Association (UMA) exhibition to take place at Lugogo show ground on the 9th October, 2013.

Stephine Coli, *a member to the group admits to have received and planted 3 pasture varieties on the small plots. She says her cows enjoy the pastures a lot and it has resulted into increased milk production. She has been able to give seed to other farmers in the group and encourages those who have not yet received to come to her. She plans to expand her pasture plots in future and start the pasture conservation.*

Nasali Petronia *another farmer from the same group says she received and planted lab lab seeds. She mixes the lablab with elephant grass and feeds her animals. She admits that they enjoy the mix and she has realized an increase in the milk production. She says*

Nabakoza Zam, another member is expecting to receive the pasture seed from M/S Stephine's mother garden. She had already prepared the garden but was delayed by the rains.

Namata Irene *appreciates NARO-ASARECA for giving them forage choppers. She says it saves them time, they use less energy and they have realized maximum use of the feed by the animals. But she further suggests that gap on the forage chopper to be increased to allow more forage pass and avoid clogging.*

"I appreciate NaLIRRI-ASAARECA interventions especially the training in vegetable drying" says Ms. Nampima Florence another member of Butale Balimi Balunzi Twegate Group. It saves them the waste that incurred before where they lacked knowledge of preserving vegetables. The drying process helps them not only preserve but also sell their vegetables outside their communities to earn an extra income and send their children to school. Members are able to save Ug. Shs 5,000 a week which they deposit into their SACCO and any member can borrow from there at low interest of 2%. She says that members grow the vegetables in their individual garden at their homes but bring the harvest to the chairperson for drying. The product is also sold as a group and afterwards each member is given her/his share with a small deduction for the packaging materials. The same applies to the marketing of their milk which sold to MAADO dairy. They pay Ug. Shs 50,000 to the transporter per month and this cost is shared by members as follows: members with 10litres and above give Shs. 8,000 per month and those below contribute Shs 5,000. She further says that working as a group has helped them benefit from many trainings and exchange visits.

Nakidde Madina *a new member to the group says she has already been exposed. She recently participated in an exhibition in Masaka town and says that many people appreciated their dried products. There was a very high demand for them (products) and other people were asking for the group contacts to come for training. The most demanded products included Nakati, Katunkuma, Corrots, Cabbages, and Egg Plants.*

The group challenges include;

1. The activity of ghee production did not take off because the milk from the animals has a low fat content
2. Drying pineapples also failed because they were taking long to dry
3. Despite high demand for their dry products, they still face challenge of packaging and labelling.
4. Members who have not benefited from water harvesting tanks still face a challenge of growing vegetables during the dry season.

11. **Kamenyamiggo District Agricultural and Information Centre**

This is a government institution in Masaka district with a major objective of training young women and men who are not able to continue to tertiary institutions because of financial problems. The Centre Manager said "*Over 500 youth have benefitted from technologies introduced by NaLIRRI and ASARECA. These include use of livestock production in vegetable production; pot-harvest procession of vegetables, forage production and utilization and general dairy cattle management@.*


A student participating in data collection (left) and students from a near-by school learning how to make manure

12. **Abandemu women's group** is located in Buyikuzi village, Lusasa-Bukulula Kalungu district. It has a membership of 20 members (3men, 4 youth).

The Project has encouraged group formation.Some of the members of Abendemu Farmers Group meeting to forge way forward

Technologies introduced to them by NaLIRRI-ASARECA project include:

(a) Improved fodder banks (maize intercropped with lablab; Napier or/and Brachiaria grass intercropped with forage legumes
(b) Water harvesting technology (the tanks)
(c) Vegetable growing

The group says that they have benefited a lot since they joined the NaLIRRI-ASARECA project. More especially, they do appreciate the trainings that have helped them to improve on feeding their animals. "We also appreciate the improved forages (especially Mulato) that make our animals look healthy" says the group chairperson Ms. Nakakande. "Lablab helps on improving the quality even when you add some water, the milk remains thick" she adds.


Ms. Nakakande (left) proudly harvests her lablab and right are the multinutrient blocks the group has been trained to make through the project,

> "*I am one of the farmers that benefited from water harvesting tanks and I get water for domestic use, irrigating my vegetables and also give to my animals. People from around have been coming here to buy water at Shs. 200 per jerican.*

The group further says that they have gained a lot of publicity by appearing on T.V such as Bukkede. They have also gained international friends from Rwanda, Tanzania, and Kenya as a result of these project activities.

> *Ms. Rose Muwanga, another member of the group says that her first yield of a mixture of lablab and maize was wonderful. "I harvested 16 sacks of maize from 1 acre. I dried the lablab and mixed with maize stover and conserved it as animal feeds. I also benefited from maize bran from maize to mix animal feeds. This has resulted in animal feed security and increased production. This has resulted in increased income that has helped me send my children to school". Ms. Muwanga said that she has been getting enough milk for sell and reserves some for home consumption. She says that though she received other pasture seeds (centro cema and sailato), she is more interested in lablab mixed with maize. She says that the milk production of her two cows increased from 10litres to 16 per day.*

Ms. Rose Muwanga with her multinutrient feed block

Mr. Kasule Matovu, *one of the 3 male members also admits that the lab lab-maize mix gave a very good yield and he was able to harvest 8 sacks of maize. "We made bails of lablab and maize Stover and taken some to exhibitions. We also received diary meal and Calliandra seeds from the projects. Last season we received Nakati seeds. All these have improved on our food and feeds for our animals. My cow's milk production has increased from 8-16litres a day.*

Philista Galiwango, *another member of the group says she received of Buga, and Nakati (vegetables) and lablab for pastures**.** He says the vegetable yields have been good and she is able to earn Ug. Shs 10,000 per week in addition to that consumed at home. The income generated from the sales of the vegetables is used paying school fees for her 3 children. "The pastures have helped me feed my animal which looks healthy though it has not given birth. I also benefited from an under-ground water tank that collects water from the roof". M/S Galiwanga many people who are not members of their group are admiring their (group members) achievements and are adopting some of these technologies such as lablab-maize mix and vegetable growing.*

Jimmy Lwegaba, *a 17 year old youth working at the Ms Nakakande's place says the project has saved him the energy and time he used to spend walking long distances in such of water. "We used to collect water in a distance of more than one mile but now the tank can store water for 3 months of the dry season. We use it for watering the animals, domestic use, irrigating the vegetables and to some cases we give to neighbors. In other instances, we sell this water to get money".*


Jimmy Lwegaba is happy that the underground) water tank (right)has eased his work and saved him time and energy fetching water for the animals

Lwanga Ssenfuka, *another youth looking after M/S Nakakande's cows is very appreciative of the pastures introduced by NARO-ASAARECA project since they give them enough feeds for the animals. This has also increased their milk production that has been reflected on their wages. He also says that he has benefited from the tours organized under the project.*

The group members mentioned the following as key benefits from group formation:

(d) Groups are easily supported for tours to learn from other areas
(e) They have been able to get friends and publicity
(f) Working in groups helps them learn from one another
(g) Groups help them handle bigger tasks that can be handled by an individual alone e.g. digging a compost pit.
(h) Farmers mentioned that the study tours and workshops were a new experience for them and were highly appreciated. The tours and workshops helped them learn new forage technologies and to increase the efficiency on their farms. The participatory approach stimulated households to exchange knowledge on all aspects of crop and livestock farming.
(i) The attitude and approach of extension staff changed. In the past, the extension staff were only concerned with animal health, when the project began the extension staff became more interested in animal feeding and breeding. Extension services especially artificial insemination was more readily available and more reliable. Farmers received more training and were involved in workshops more often.
(j) Participating farmers reported that their success in the trials attracted many other farmers from within and outside the district.
(k) The group members involved themselves in various economic activities such as crop and livestock production and drama as a means to raise their standard of living.
(l) Being together in groups helped them to combine their efforts in improving their economic activities.

(m) The groups also helped women to get recognition in the village and respect by their husbands.
(n) These women further stated that the project activities have kept occupied and there is no-more idleness that results rumour mongering among women.
(o) As a result of the popularity of our group, our members have gained positions of leaderships in different institutions such churches, schools and hospitals where we serve on different committees" says the chairperson of Abendemu women's group.

Caroline Kasule, *another member of the group says that ASARECA helped her with forage seed (lablab, centrosema). She says that it has helped her feed the animals and get better milk as compared to the other people who are not participating in the project. She says she was trained in silage making and they later other farmers. As a result of these project activities, there have been an increase in the income of the group members and this has enabled them send children to school. They also have enough milk for home consumption.* "My daughter delivered a kid when she *was still at school and so had I take up the baby at 2 months old to allow her (my daughter) return to school. Because of enough milk I was getting from my cows, I was able to raise the infant and as I talk now, he a big boy in Primary three" says Mrs. Kasule*

Mrs Kasule proudly shows off her grandson she has been able to support with increased milk earnings

Ms. Tereza Nakirya, a 75 year old widow with 30 orphans said that she *have increased milk yield & income, reduced work & we are healthy. I have a new house and the children go to school. The treadle pump helps me to keep fit"*


Ms. Nakirya offering feed to her cow (left) and with some of her orphans and her renovated house (right)

They suggest that a project gives them other dairy breeds that feed less compared Frisian which they say they are heavy feeders.

B. Farmer testimonies from Ngora District

1. Margret Kongai hails from Osigiria Village, Ngora town council in Ngora District

"*I received a heifer cow from Send a Cow to keep under zero grazing system. At the beginning, I was faced with lack of enough pastures to feed my animal especially in the dry season. I also lacked enough water to use at home and also give the animal. The drought season is really harsh in Teso region. I was later helped by researchers from NARO-NaLIRRI-ASARECA who helped me with the following; pasture seed- Caliandra seedlings, Brachiaria and a fixed forage chopper, vegetable seeds- Sukuma wiki, tomatoes and egg plants. They also constructed an under-ground water harvesting tank*".

Benefits from the project

(a) The pastures performed very well even during the dry season, I could still harvest the green pastures and feed my animal direct. I have reserved another area where I am going to grow more pastures and conserve them into hay. The forage chopper has made the work of chopping grass so easy and faster and I am able to save a lot of time to attend to other business. The pastures doubled the milk production of my cow from 5litres to 10 liters a day.

(b) Vegetables too did well with the exception of tomatoes, this was because we practice organic farming and therefore we don't encourage the use of chemicals. Never the less, I was able to get some for home consumption and also sold some to the surrounding community".

Ms Kongai appreciating the high yield at her vegetable garden

(c) The project has training us on value addition. This included vegetable drying using a solar drier, milk processing (ghee, cheese, yoghurt and butter). Most farmers in her group have picked interest in vegetable drying because it helps us to preserve the vegetables for a long time in addition to drying. Margret sells her vegetables to the near-by Ngora High school and she is able to fetch Ug. Shs. 200,000 a month from an area of less than half an acre. She sells her eggs plants to the locals around.

Challenges

(a) Margret says that they were given little starter seed for the pastures but they learnt to multiply their own seed.
(b) The material used in the water harvesting tank has been destroyed by the spear grass, heat and termites resulting in dysfunctional tanks. The heat also destroys the materials of the solar drier trays.


Challenge: Ms Kongai shows the solar dryer material that failed and left is the water harvesting material damaged by termites.

2. **Olupot Rehema hails from Osigira Village, Ngora Town council. She had earlier received from Send a cow project before the NARO=NaLIRRI=ASARECA intervention. She went ahead to write another proposal that earned her another heifer.**

Rehean says the interventions of the NARO-ASAARECA did not only bring her new technologies and knowledge but also exposed her to more friends. Rehema has benefited from the following technologies from the project;

(a) Fixed knife forage grass chopper,
(b) Treadle pump,
(c) Improved pastures seeds,
(d) Vegetable seed

Benefits

(a) In the first season of planting, Mr. Rehema was able to earn Ug. Shs 170,000/= from her vegetables. She also realized the importance of the pastures and she plans to expand from original small plot to half an acre during the rainy season.
(b) She appreciates the trainings she got from the project especially on vegetable processing which increases the shell life the vegetables, but admits that they still have a challenge on attracting the market beyond their community because of poor packaging. On value addition to milk, the group is unable to find on a local market a special material used for sieving ghee.
(c) She appreciates the project interventions that have resulted in increased food in the homes and also selling the surplus to earn money. They have also received visitors from outside their communities and they too have got a chance to go visit other farmers beyond their communities.

Rehema' well-fed cow due to improved feeds

"*As a married woman, I no longer wait for my husband give avail everything at home since I am able to raise some income support him by buying home needs (sugar, salt, soap, paraffin) and the balance contributes to the children school fees*"...says Rehema.

3. **Mr. Ouma Silver from Okoia vaillage, Ngora town council**

He received vegetable seeds (onions, cabbages, *Sukuma Wiki*, and green paper) from the project.

Benefits

(a) Before these interventions, he used to have shortages of vegetables for home consumption. But he now has plenty of the vegetables that have resulted in improved on his family's nutrition status. "*My kids now look very healthy*" Mr. Ouma states. "*Vegetables have also increased my income since I sell some to the market*".

(b) He also says that training on vegetable drying has helped them conserve the vegetables for 'hard-times' i.e. during the dry season. He further says that he is one of the beneficiaries of the rain water harvesting technology but he no longer uses it because the material used for lining was weak and no longer holds water. His suggestion to this is using bricks and cement instead of tarpaulin. He believes that with efficient rain water harvesting technology in-place, they will be able to produce the vegetables all year round.

4. **Mrs. Asio Jennifer hails from Kumel Village, Mukula Sub-county.**

Mrs. Asio says that before the project intervention, the wife and husband husband were living in complete poverty with no clear source of income. When she joined the project, she got exposed and got more informed. She received vegetable seeds and a drier from the project. This has resulted in increased family income earned from the vegetable sells. "*We recently purchased a goat* ".

Challenges

(a) Despite the benefits, Mrs Asio says they still face some challenges; she talked about the solar-dryer trays that are continuously spoilt by the sun heat.
(b) Her failure to grow the vegetables during the dry season because the nearest source of water is 3 km away.
(c) She plans to expand on her vegetable growing enterprise and earn more money. Never the less, she acknowledges the efforts of the project.

5. **Ms. Achamu Florence from Nayamongo village, Ngora S/C**

Mrs. Asio said "*I thank the project for the support extended to us. I have benefited in both knowledge and skills gained from the trainings offered. I was given pasture seeds and I am able to provide pastures to my animal even during the dry season". The training on vegetable conservation helps her preserve the vegetables for long time. "I got Ug. Shs 120,000 from green paper and Ug. Shs 180,000 from tomatoes in one season. One tomato plant gave me up 100 fruits, what would happen if I had planted many of these? I am very grateful to this project and I am going to expand the size of the gardens" says M/S Achume as she puts on a big smile.*

6. Apolot Jane Emurai from Osigiria Western Ward, Ngora T/C

"*I am grateful to NARO-NaLIRRI-ASARECA because of the interventions they introduced in our district. Due the trainings attended in vegetable production, I have been able to produce enough vegetables for my home consumption and sell the surplus to generate income. I used to find challenges in getting money to pay for my kids in school but as I talk now, I have one boy in Senior 3 at Ngora High School where I agreed with the school administration that I keep supplying them with vegetables to cover up for the boy's fees. This has reduced the stress since I am not required to raise the full tuition at once".*

Apart from the school, she supplies to the community around her and the markets in the town council. Also members from the community assist her in carrying out some of the activities such seed bed preparation and in the end she gives them seedling and they are able to have their own vegetable gardens.

"***Vegetable growing reduces domestic violence since women become independent and generate income to cover home needs such as food*"**

7. Akurut Rose received *blakeria* seeds from the project.

"*I have stopped moving long distances to look for pastures for my animal. This helps save enough time to do other things like gardening. The improved pastures have increased on the milk production of my cow from 5litres to 10litres per day*" say Akurut.

She further said that as compared to elephant grass that dries off in dry season, Brachiaria is drought tolerant and high yielding.


"*I am able to get enough milk for home consumption and sell the rest to generate income. I look forward for forage chopper like my other colleagues and maximize forage utiilisation. I use the leftovers to mulch my oranges which has enabled them to withstand the drought."*

8. Amongin Anne Grace

Anne Grace said that she is very grateful to NaLIRRI and ASARECA for introducing the project in our village. The project repaired my source of water and provided me with a treadle pump. I am now able to irrigate my vegetables and mangoes. I harvest over 1000 mangoes per tree and this gives me about Ushs 1,000,000 per year. The treadle pump helps me to keep fit. I am also getting money from sale of dried vegetables


Before (left) and after (right) NaLIRRI-ASARECA interventions

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