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INNOVATIONS THAT YIELD HIGHER INCOME

ASARECA and partners have been implementing a project, "Harnessing crop-livestock integration to enhance food security and livelihoods resilience to the effects of climate change in Eastern and Central Africa," since 2009.

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A big thank you to all ASARECA development partners

I would like to thank the development partners who have supported ASARECA over the last 20 years of existence. These include; European Union (EU); Department for International Development (DFID), United States Agency for International Development (USAID), Canadian International Development Agency (CIDA-CANADA), Swedish International Development Agency (Sida-Sweden), International Development Research Center (IDRC), African Development Bank and the World Bank.

With your financial and technical support, ASARECA has been able to develop and promote 364 gender responsive technologies, innovations and management practices (TIMPs). These include improved varieties and seeds; water management practices, integrated soil fertility, agronomic and storage packages, value addition technologies and innovative marketing tools. The interventions directly benefited over 1,370,000 smallholder households with an average size of six family members each (8million individuals). The capacity of these households to engage in productive and profitable agriculture was no doubt strengthened. ASARECA initiatives also opened up market opportunities for the farmers to buy farm inputs and sell their produce. This enhanced their productivity, leading to improved access to food, nutrition and income.

The list of TIMPs generated over the years cannot be well articulated in this limited space. However, I would like to highlight just a few and these include:

- Management practices for pests and diseases have been developed to deal with Striga in cereals, Cassava Brown Streak and Mosaic in cassava, Maize Lethal Necrosis, bean anthracnose, Wheat Rust and Banana Wilt.
- Drought resistant germplasm has been developed in indigenous maize and sorghum varieties to confront steady but slow threat of drought.
- Crops for high nutritive value such as



ASARECA Executive Director, Dr. Fina Opio, presents a plaque to one of their donor representatives, Peter Ewell from USAID, during a close interaction in Entebbe, Uganda recently. Dr. Ewell is retiring from USAID soon.

orange fleshed sweet potato and quality protein maize, millet and sorghum and nutritionally enhanced foods for women and children have been developed.

- 37 policies, laws, regulations and procedures have been approved by various legislative bodies such as the East African Community, the Common Market for Eastern and southern Africa (COMESA) to enhance sharing of innovations within ECA.
- The productivity of priority crops and livestock in the dry lands has been increased. In Kenya for example, maize yields have more than quadrupled through water conservation practices. Through improved feeding and breeding, milk yields more than doubled in the various project sites in the Eastern and Central Africa region.
- Degraded land has been reclaimed in Kenya, Ethiopia and Eritrea. Through downscaled forecasting, efficient water use innovations and provision of quality planting materials, maize yield in drier parts of Kenya and Ethiopia has increased

from 0.5 tons/ha to 3.2 ton/ha and thus getting about 1,600 households out of the food insecurity bracket. Similarly, through improved adoption of water productivity innovations and market linkages, off-season onion growing is becoming a major source of income for small-scale farmers in Madagascar.

- Genetic diversity for conservation, disease resistance, and improved productivity has been harnessed through genomics.
- A total of 40 farmer innovation platforms have been established for collective marketing in the sub-region. Over 30,000 farmers are benefiting directly from these platforms.
- Seed policy regulation for variety evaluation and release; phyto-sanitary regulation, seed certification and plant variety protection, Potato and Cassava standards in East Africa have been developed. As a result, the production and movement of certified seed between countries using tissue culture has been enhanced. These are just a few



ASARECA staff pose with Peter Ewell from USAID, during a close interaction in Entebbe, Uganda. The staff described Ewell as a friend and Ambassador of ASARECA.



that can be cited briefly. We welcome you to familiarise yourself with ASARECA TIMPS through our website www.asareca.org. I would like to pay tribute to the National Agricultural Research Systems of the 11 ASARECA countries for their commitment in implementing ASARECA supported projects which produced these successes.

Ushering in OP II

ASARECA is operating through a strategic plan (2008 – 2018) implemented under two Operational Plans: 2008 – 2013 and 2014 – 2018. As the first Operational Plan comes to a close this December, the 2014 – 2018 Operational Plan has been developed. The new Plan seeks to harness opportunities and challenges in the dynamic Policy and physical environment to deliver benefits of agricultural research and development to the people of the region in a more effective way.

It is for this reason that the ASARECA activities in the new Plan, starting January 2014, will be clustered around themes. Three Themes have been identified through wide consultations. These are:

Sustainable Agriculture, Food Security and Nutrition: This theme is concerned with developing and scaling up innovations and technologies that enhance productivity,

sustainable intensification of agricultural systems and post harvest handling among other issues.

Markets, Market Linkages and Trade: This thematic area is about linking farmers to markets; facilitating development of enterprises, value chains for different priority commodities, policy formulation and harmonization across countries.

Natural Resource Management and Ecosystem services: This theme is concerned with improving agricultural water and soil productivity, adoption of climate smart forestry, agro-forestry and biodiversity conservation as well as enhancing resilience of dry-land agricultural systems, among other issues.

Come and join us in Bujumbura

ASARECA has organised the Second ASARECA General Assembly and Scientific Conference to take place from December 9-13, 2013 in the Burundian capital city, Bujumbura. You are all welcome to take stock of achievements and lessons learnt from the first Plan. We hope this gathering of minds will enrich work that lies ahead of us. See you in Bujumbura.

Dr. Fina Opio,
Executive Director, ASARECA



An improved calf being reared for dairy milk production. Integrating crops and livestock is crucial for appropriate feeding.

The National Agricultural Research Institutes of Uganda, Kenya, Tanzania and Burundi and other partners have been promoting climate smart agricultural technologies and innovations such as drought tolerant forages, water harvesting, soil fertility management and drip irrigation for year-round vegetable production in smallholder dairy-vegetable systems.

The project sites include Masaka, Ngora and Kumi districts of Uganda; Machakos, Wote peri-urban areas and around Wamunyu trading centre in Kenya; Bururi and Gitega provinces of Burundi and Ilemela and Nyamagana districts of Mwanza, Tanzania.

Targeting zero grazing

The project targeted zero-grazing dairy farmers with 1-2 cows, at least 2 ha of land of which 0.5 ha was already planted with Napier grass fodder, a basal forage in intensive smallholder dairy systems.

Increasing profits

The project is implementing activities to improve efficiency and the quality of production to increase profitability using crop-livestock innovations that are suitable for smallholders. The following are some of the project's achievements:

Integrating crops and livestock farming is an excellent mix to increase farmers' incomes and improve nutrition. Fodder tree technology has improved daily milk production by 30% when fed to dairy cattle during the dry season. Rainwater harvesting techniques and drip irrigation are providing water for domestic animals and have increased vegetable production by 40%. An improved fixed-knife forage chopper has reduced forage wastage by 20% and the time farmers spend in the activity by 30%.

Rainwater harvesting

In project sites in Kenya and Uganda, the project constructed rainwater-harvesting tanks in some of the participating homesteads. Micro-catchment holes (tumbukiza) and shallow wells were dug in fodder fields and other locations to demonstrate simple water-harvesting and water-conserving techniques.

Using farm yard manure

These holes have been integrated with

drip irrigation and use of manure on vegetable and fodder gardens. Farmers in Masaka, Uganda, who received drip irrigation kits and used manure to produce cabbages year-round, report that yields are 40% higher than in plots without these interventions.

The project provided dam liners and treadle pumps, while the farmers contributed labour to dig the pits and roofing materials. Water harvesting enabled farmers to collect additional water for household use and livestock. In some households, up to 35,000 litres of water per season was collected. About US \$ 30 per month was saved on water bills. Family labour was shifted to other farm activities, thus increasing overall farm productivity.

Fodder trees

Fodder trees *Gliricidia* (*Gliricidia sepium*), *Calliandra* (*Calliandra calothyrsus*) and *Sesbania* (*Sesbania sesban*) have been introduced on farm to supplement feed for dairy cattle, improve soil fertility, and control soil erosion. *Leucaena* fodder banks have been established in Kenya and Burundi. On-farm case studies showed that supplementing 2 kg dry matter of *Calliandra* leaf hay mixed with 1 kg of maize bran to dairy cows, improved daily milk production during



Testimony: I earn \$430 monthly from milk sales

Mr. Peter Ddaki and his wife Nnalongo of Kitenga village, Masaka, Uganda

We get about 41 litres of milk daily from our three dairy cows. We consume 5 litres at home and sell 35 litres. This gives us about Uganda shillings 36,000 (USD \$ 15) daily or shillings 1 million (\$ 430) monthly. Every year, we produce enough food for sale and for family consumption. We are able to satisfy our nutritional needs, pay school fees and meet other financial obligations. We have an underground rainwater tank, which we use to irrigate the various food

and fodder crops on our 4-acre farm; and for the livestock to drink. We use an improved forage cutter. Previously, we used crude tools like the machete and this came with the risk of chopping off our fingers. We use cow dung and urine collected from the zero-grazing unit and other organic materials to make compost manure for fertilizing the gardens. The banana leaves and trunks also provide mulching material for the soil and plants.

the dry season by over 30%. Drought tolerant forages and water harvesting technologies increased fodder availability by 76%, water offered to animals by 46.3%, milk yield by 78.7% and cash incomes by 52.4%.

Intercropping practices

Napier grass/*Centrosema pubescens*:

In Uganda, farmers intercropped Napier grass with *C. pubescens*, a tropical forage legume. In this combination, Napier grass dry matter yield increased from 10t/ha to 12 t/ha per year. The forage legume contributed about 26% of total fodder yield and in addition, improved the crude protein available to dairy cattle. In Tanzania and Kenya, the tropical legume *Clitoria ternatea* was used instead of *C. pubescens* because it yields larger quantities of fodder.

Maize with lablab: When maize was intercropped with the forage legume *Lablab purpureus*, fodder production increased by 26% and maize grain yield by 6%. Lablab controls weeds

that compete with maize for nutrients and moisture, saving farmers weeding costs of about US\$ 50 per hectare each weeding season.

Small-scale hay and silage-making techniques:

The project trained farmers and other stakeholders in the project areas in producing, conserving and using forage as resources to address the scarcity of feed in the dry season. Hay balers were developed and distributed to farmers. A modified wooden hay baler enabled farmers to conserve excess fodder, reduced forage scarcity during the dry season.

Fixed-knife forage choppers:

The project introduced a modified fixed-knife forage chopper to reduce the drudgery for women and children cutting fodder for dairy cattle. Cutting fodder using a machete is tedious, time consuming and risky. In addition, the chopped pieces of forage are of irregular length, which contributes to reduced feed intake by cattle, as they prefer to eat

uniform pieces. Farmers have reported that using the modified chopper, the time they spend cutting forage has reduced by about 30%, and forage wastage by 20%.

Addressing value chain issues

A milk producers group comprising 25 men and 15 women was formed in Nyamagana district, Tanzania, to address challenges of milk marketing. In Kumi district, Uganda, four marketing associations, each with 30 farmers, were established to manage vegetable marketing. These associations have initiated three vegetable collection centres to ease joint marketing.

Scaling-up

Each of the targeted 11 household farms in Tanzania improved the availability of feed resources by planting an extra 0.5–2.5 acres of *Cenchrus ciliaris*. In Tanga, four out of the targeted seven household farms established Napier grass plots to supplement *C. ciliaris*. All four farms in Morogoro introduced *Leucaena diversifolia* on contour bunds. In Rwanda, an additional 18 smallholder farms established new forage plots of *Brachiaria mulato*, *Mucuna pruriens* and Napier grass.

In Tanzania, a feeding ration consisting of maize bran, cotton seed cake and minerals containing 75% energy, 20% protein and 5% percent mineral produced significantly higher milk yield per animal per day than any other ration.

Homemade feed rations

Homemade nutrient feed block technology was introduced on-farm to provide dairy cattle with a cheap source of protein, energy and minerals.

Soil improvement

Vegetable yield increased by 500% as a result of irrigation and organic manure application. Vegetable revenue increased from US \$ 20 to 150 per month. Investing in cattle or poultry manure in vegetable production increased net returns by more than US \$ 1,415 per ha per season.

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Testimony: I earn lots of income from selling vegetables

Margret Kongai, Osigiria Village, 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- Caliantra seedlings, Brachiaria and a fixed forage chopper, vegetable seeds- Sukuma wiki, tomatoes and egg plants. They also constructed an under-ground water harvesting tank. The pastures performed very well even during the dry season, I could still harvest the green pastures and feed my animal direct. 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. Vegetables too did well. 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.

Testimony: We have established a milk collection centre



Nakayiki displays her vegetable drying and preservation innovation in Masaka

Nakayiki Rose, Chairperson, Butale Balunzi Twegatte Group, Bukoto in Masaka

We are involved in vegetable growing and zero grazing. Before NaLIRRI-ASARECA project, came, we had lost hope in farming due to long droughts,

lack of markets for our vegetables, and milk. The quality and quantity of milk was low. We got 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 from the project. Today we process and sell their vegetables at competitive prices.

Quality of milk improves

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.

Nutrition gets better

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.

We want more private sector — stakeholders tell ASARECA



ASARECA Executive Director Dr. Fina Opio (extreme left) joins Uganda's Vice President, Edward Ssekandi (5th from right), Agriculture Minister Tress Buchanayandi and other distinguished delegates during the International Symposium and Exhibition on Agricultural Development in the East African Community partner states. ASARECA received valuable feedback from stake holders

Delegates at the International Symposium on Agricultural Development have hailed ASARECA for implementing the Agricultural Innovation Systems (AIS) approach to stimulate technology uptake by farmers. The delegates noted that AIS is crucial because it allows farmers to participate in the development process.

Increase tenure of projects

Speaking at the Symposium organized by Kilomo Trust and ASARECA, the delegates asked ASARECA and her development partners to consider designing and implementing long term projects for research into generating new varieties.

They cited generation of new livestock breeds and biotechnology as some of the areas where results cannot be realized within two to three years. ASARECA projects currently last two to three years.

Under the theme:

Lessons from the Past 50 years, Prospects for the Future, the symposium held at Serena Kampala Hotel from November 4-8, attracted over 200 delegates from

Eastern and central Africa.

Increase member support

The participants also called upon ASARECA member countries to increase their contributions towards funding of regionally coordinated agricultural research projects, and involve other ministries that influence the agricultural value chains and policies in research efforts. They welcomed ASARECA plans to establish a sub-regional knowledge hub.

Speaking at a side event organized to take stock of ASARECA work and prepare the region for the next phase of ASARECA research for development initiatives, which start in 2014, the delegates provided other feedback to ASARECA highlighted below:

- The private sector in the member countries should be mobilized to fund agricultural research since they are major beneficiaries.
- ASARECA and the World Bank should help fast-track mechanisms to enable other ASARECA countries to establish

regional centers of excellence under the Eastern African Agricultural productivity program (EAAPP).

- Conduct capacity building on knowledge management.
- Establish online databases of the technologies and innovations that the national Agricultural Research Institutes have developed and are disseminating.
- Establish policies and institutional arrangements to protect farmers from fetching low prices during bumper harvests.
- Establish disaster preparedness strategies to quickly address emerging issues such as pests and diseases.
- Coordinate efforts in collecting data on food prices in Eastern and Central Africa in order to avoid duplication of efforts.
- Follow up on the understanding and implementation of the many Standards that have been gazetted by the EAC.

Smallholder farmers embrace commercial AIV farming

Bustling lunch time activities at the Bridges Organic Health Restaurant in central Nairobi city is a clear testimony of the new buzz phrase 'living healthy'. Regulars at this restaurant compete for sitting space to avoid missing on the health menu, which largely comprises African indigenous vegetables (AIV).

AIVs become popular

"The importance of the AIVs is becoming phenomenal by the day as its nutritional value is being realized. I don't afford to have a meal here every day, but I make efforts to grab a plate at least twice a week," says Nyambura, a Nairobi resident, as she scoops amaranthus soup from a dish. "I am assured of micronutrients such as iron, zinc, vitamins, and minerals from this soup."

At Rift Valley Provincial General Hospital in Western Kenya, a group of women grow an array of AIVs on a 2-acre farm that they supply to patients in the hospital and other vulnerable groups in Nakuru County. This is the profile that is emerging of AIVS in the sub-region.

Supply not matching demand

While the consumption of AIVs increases, its supply remains low due to lack of quality planting seeds. ASARECA in partnership with Kenya Agricultural Research Institute (KARI), Simlaw Seed Company-Kenya, Institutdes Sciences Agronomiques du Burundi (ISABU) -Burundi, Excel Hort Consult Ltd-Uganda; and CABI International kicked off initiatives to provide farmers with improved, high quality seed to increase the supply of the much needed crop.

According to Nasambu Okoko, the Principal Investigator of the project, high quality seed leads to high quality leaf. "Once the leaf quality is secured, you can be sure of a willing buyer even at high-end shopping outlets," she observes.

Through the project, "Up-Scaling the production of priority African Indigenous Vegetables in Eastern Africa", farmers



AIV garden in Kisumu, Kenya. AIVs have attained a prestigious position on the market

are being helped to establishing farmer-led seed enterprises for AIVs. ASARECA and partners are also building capacity of farmers to produce high quality seeds and strengthening linkages along the AIV seed and vegetable value chain. They have received training in improved production and marketing and farming AIVs as a business. All the efforts are geared towards boosting household incomes and nutrition in Kenya, Uganda, Burundi and Rwanda.

According to Dr. Vick Ruganzu, Head of Soil Quality and Plant Nutrition, Rwanda Agricultural Board (RAB), the Rwanda government has embraced AIVs through the National Multi-Sectoral Strategy to Eliminate Malnutrition in Rwanda. "The ASARECA AIV initiative is crucial to achieving the government nutritional goals," says Ruganzu.

Farmers trained

In Kenya for example, in 2010, a group of 294 people in Bungoma in western Kenya was linked with the Kenya Seed Company Ltd. These farmers, nine stock sellers and marketing agents and 13 field assistants were trained in the regulatory requirements for seed production, post-harvest handling, processing, packaging and marketing. The farmers were

registered and supplied with seeds of amaranthus, African nightshade, jute mallow and crotalaria. Farmers in the area had prioritized the four species. The quantity of seed they produced increased significantly following training. Amaranthus seed production increased from 2,134kg in 2009 to 5,918kg in 2010. African nightshade increased from 3,832kg to 27,997kg; jute mallow increased from 1,770kg to 17,706kg and crotalaria from 6,669kg to 24,253kg. When sold, this seed earned a gross income of US\$519,309; each farmer earned on average US\$4,500, up from US\$1,500 before the intervention.

In Uganda, close to 300 selected farmers from Mbale and Kabale districts are engaged in AIV production and marketing after receiving training and accessing start-up seed.

In Arusha, Tanzania, contracted growers sold 1,864 kg of African eggplant seed, 1,644 kg of amaranthus seed and 1,337 kg of African nightshade seed and earned about US\$40,000.

In Burundi, the production of amaranthus and African eggplant is increasing as AIVs become a common item in major supermarkets and green grocery stores.

Rwandan youth embrace farming for the market



Florent (Centre) with other members of his group weeding their AIV garden in Musanze, Rwanda

Twenty-one-year old Florent, who had dropped out of school due to lack of school fees, can finally heave a sigh of relief. His dream of pursuing a degree in a technology-related area is about to come true, thanks to the ASARECA AIV project.

Noticing the gains from AIVs

Florent is one of many youths attracted by the AIV market-led production of seed and vegetables. Although in the past young people have had poor perception of farming, the youth in Musanze district in Rwanda have realized the gains in AIV farming.

But what attracted Florent to AIV farming? "During a two-day training offered by ASARECA facilitated Imbaraga Rwanda Farmers Federation, I gained knowledge on AIV best agricultural practices, including seed production, farming as a business, post-harvest handling and marketing. I saw the potential in AIVs."

Growing AIVs as a business

Florent belongs to a farmer group of 7 men, 19 women and 8 youth, who call themselves Dufatanyetwese, (meaning let's work together). "Instead of idling with other young men, I realized that AIV farming was being positioned as business. Besides record keeping, we observe the best farming practices," he says. The group has hired a 1-acre plot where they grow amaranthus and African eggplant, and each member also has an individual AIV plot.

AIVs demand swells

The demand for African indigenous vegetables (AIVs) has increased as their nutritional and economic value gets re-discovered. "AIVs have been in existence for a long time in sub-Saharan Africa. However, the introduction of exotic vegetables into mainstream agriculture suddenly undermined AIVs, relegating them as food for the poor," says Faith Malavu of M-Care Medical Centre in Upper Hill, Nairobi.

Pursuing healthy diets

However, the increase in metabolic illnesses has sparked off an era of healthy diets among many, leading to high demand for AIVs. AIVs are a good source of vitamins A, B complex, C and E; minerals and fibre, yet they are also affordable. "However, the supply of high quality AIVs has been undermined by lack of clean seed.

The ASARECA project, "Scaling up farmer-led seed enterprises for sustained productivity and livelihoods in Eastern and Central Africa", recognised this challenge and started initiatives in Kenya, Rwanda, Burundi and Uganda to help smallholder farmers to access high quality AIV seed.

"We provide farmers training on AIVs best farming practices, and post-harvest handling. We are promoting consumption of AIVs and creating market to increase farmers' income," says Nasambu Okoko, the principal investigator of the project. Today, smallholders' perception about AIVs is changing. They are now looking at farming as a business. They are also organized in producer groups and are linked to both formal and informal markets".

Taking banana bacterial wilt 'by the horns'

Bananas and plantains are a major source of food and income for about 30 million people in Eastern and Central Africa (ECA). The region produces about 20 million tonnes of banana annually; however, the production is constrained by Banana Bacterial Wilt, also known as Banana Xanthomonas Wilt (BXW), among other factors.

Colossal damage

The disease, which causes premature ripening and subsequent rotting, has led to a huge reduction in banana yield and losses in income for banana farmers. It has also contributed to the high price of banana in the local markets. BXW was first reported in Uganda in 2001 and has since spread to Burundi, DR Congo, Kenya, Rwanda and Tanzania.

Collective action

With the livelihoods of millions of smallholder farmers in countries in ECA threatened, and economies impacted by BXW, ASARECA, working with a ray of partners championed a regionally concerted effort to stop the spread of disease and develop management options to revive banana production. Efforts attracted the support of CGIAR centres, namely International Institute of Tropical Agriculture (IITA), Bioversity International, and international bodies like the Food and Agriculture Organisation, and a number of NGOs.

Investment worth making

Between 2009 to date, ASARECA has invested about US\$1.4 million to tackle the problem.

Technologies making a difference

Three technologies including single stem removal, male bud removal and disinfection of pruning tools are currently being promoted and scaled out. In addition, two innovations namely; decapitation and macro-propagation, have been tested and found to be effective for rapid seedling multiplication at community level for replenishing destroyed fields. These are being outscaled. A number of proven and cost-effective measures



A farmer in Bukoba, Tanzania shows off a rehabilitated banana plantation

Three technologies including single stem removal, male bud removal and disinfection of pruning tools are currently being promoted and scaled out. In addition, two innovations namely; decapitation and macro-propagation, have been tested and found to be effective for rapid seedling multiplication at community level for replenishing destroyed fields. These are being outscaled

are being promoted. These include disease identification, proper handling and use of farm tools, handling of infected plants—particularly removal or destruction of infected plants, other preventative measures such as male bud removal and community by-laws on how to handle BXW infestations. In addition, several innovations have been introduced for rapidly getting clean planting materials and how to revive infected fields.

Scientists, farmers work together

Scientists and farmers from the affected

Testimony

Skalion Geras, Ijumbi Muleba district, Tanzania: I produced banana for both home consumption and sale and always harvested close to 300 bunches a month before BXW attacked us. At the height of the disease, I was harvesting only 10-15 bunches a month. I took a bold decision to uproot all plants and planted new ones. Since then, I have not had incidents of the disease on my farm. I religiously practice uproot-and-burn and male bud removal using the forked stick. Currently, production has reached 25 bunches a month and I am sure it will improve further.

countries work together by sharing experiences and practices to rehabilitate banana fields to get back to the previous production levels. Apart from farmers, the project team works closely with

Testimony: I have replanted banana according to expert advise

Mzee Koloneli from Ruhunga Ward, Tanzania: I lost my entire crop to BXW. However, in early 2010, help arrived through ASARECA and Agricultural and Rural Development Initiative (ARDI).

The scientists advised me on simple measures to control the disease. That is when I realized that I had used my tools indiscriminately and ended up spreading the disease throughout the plantation. I have since replanted according to the recommended control measures. I am sure I will attain the production levels I had before the disease hit my farm.



Mzee Koloneli in his garden. He uprooted all sick plants and replaced with these clean materials

community leaders, local government officials, researchers, extension staff and the media, who help in disseminating information to wider audiences.

Achievements

Banana production is being revived in the project areas and even beyond. The ecological integrity of rehabilitated areas is being restored especially in hilly areas. Two mother gardens were established in two hotspots in Tanzania (in Karagwe and Bukoba districts) and in Burundi (Mahwa and Mparambo) to reproduce clean planting materials using tissue culture techniques.

Farmers embrace new measures

When combinations of measures were used in Uganda, within the first six months, the proportion of farmers who managed to control the disease increased from below 5% to over 60%. Within 15 months, banana production recovered from total loss to between 2.5% and 30% across four hotspots and in some areas to as much as 60% of the previous production levels.

Given that the average production of banana under optimal conditions and appropriate agronomic practices is 80 bunches per acre, these farmers increased their production to over 50 bunches (each is 20kg). Based on prevailing farm-gate prices of US\$6

a bunch, each farmer generated an average monthly income of US\$300. On the other hand, organised farmer groups in western Uganda earned as low as US\$30 per month from their infected farms in 2009. However, in under three years, these farmers' groups earned US\$21,600 (a monthly increase from US\$30 to US\$600).

Scaling out

BXW control is now being scaled out to neighbouring communities and districts through sensitisation and training by their local leaders, the media and extension staff. This has been made possible due to lessons learnt from communities that have rehabilitated and replanted their fields. People learning that if they use these measures, they can increase their banana yields within a short period.

Communities take charge

BXW control has become a community affair. In the Eastern Province of Rwanda, stringent by-laws crafted by the communities themselves were used to resuscitate banana production in affected areas with the resultant outcome of increased production to nearly 80% of previous levels. In Uganda, the government has recognised the impact of BXW through various interventions and invested US\$1.9 million to tackle the menace.

Testimony

Edwin Sarapion, Ruhunga Ward, Tanzania:

I am one of 20 farmers who participated in the training offered by ASARECA and ARDI on clean banana seed production. I was among the group of farmers trained in macro-propagation and decapitation. I received support to construct a macro-propagation unit. I provided the land and labour while the project provided construction materials valued at TZS 1,600,000 (approximately US\$1,000) and technical expertise. I now own one of the seven macro-propagation units that have been built in the ward. I have already planted the corms. I hope to sell each seedling for TZS 500 (US\$0.3). I can harvest up to 2000 plantlets annually.

Counting the gains from water and soil management

ASARECA and partners have been helping farmers in Eastern and Central Africa (ECA) to confront effects of climate change. Through the project, "Integrated management of water for productivity and livelihood security under variable and changing climatic conditions in ECA", ASARECA and partners are supporting farmers to pursue proper agronomic practices and make the best use of available rain water to increase productivity of their land. It is implemented in partnership with the National Agricultural Research Institutes of Kenya, Ethiopia, Rwanda, Madagascar and Eritrea. Started in 2011, the project addresses water productivity issues at the farmer's levels and at watershed levels. ASARECA and partners are underscoring the fact that even minimal amounts of water if well harnessed, can be used to produce adequate food. They are also emphasizing that integral agronomic practices ranging from intercropping, mono cropping, the use of fertilizers, spacing, timely planting, crop rotation, the use of certified seed, correct weeding, etc., are part and parcel of the broader response to climate change. Below are snapshots of success stories from project sites:

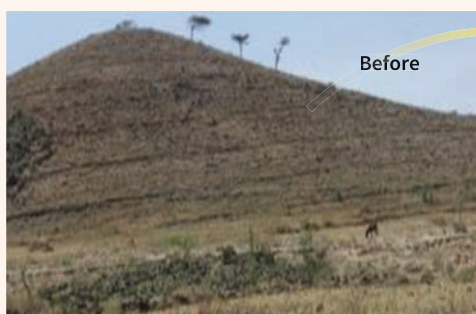
Producing even in drought

Through participatory approach, farmers in the watersheds have for two consecutive seasons tested and adapted different improved varieties of the major crops that can produce a considerable yield in moisture stress conditions with the local varieties.

The crops include Maize (Melkassa II, Melkassa IV, Melkassa VI and the local variety), Tef (Tsedey, Qunco, Magna, Dukem, and local variety), Wheat (picaflor, Hawi, Danfe and local variety), Haricot bean (Nasir, awash Melka, Dinkinesh, Awash I and local variety) and Barley (Sabini and local variety). An increased percentage (85% to 246%) in crop yields have been observed in crops like Haricot bean and maize in Ketchema watersheds while a considerable yield increase (3.5% to 43.8%) was recorded on the other commodities in both watersheds.



Restoring the barren hillsides of Ethiopia



The hills were for a long time degraded by human activities leading to accelerated soil erosion and decline in crop yields. The productivity of the main crops namely; teff, wheat, barley, field pea, field bean, haricot bean and maize was very low. During the intervention, farmers have rehabilitated two barren hillsides in Ethiopia using simple technologies such as area closure and application of different bio-physical soil and water technologies while planting exotic multipurpose trees and teff seed to add organic content on the bare hills.

The hills have been totally reclaimed with a thick undergrowth of grass and different species of trees on this renewed topography. Run-off has been cut freeing the slopes and valleys for cultivation.

Farmers have organized regulated harvesting of grass for feeding livestock and are trying new wheat and teff varieties suited to the climate. The hill is also contributing to the mini-climate of the area, which used to be too hot. Farmers are working hard to minimize the impacts of runoff on

farmland by creating stone-bunds and cut off drains, commonly known as fanyajuu and fanyachini technology. The communities have also constructed check dams. So far, one gully has been selected to be reclaimed. Individual farmers are now starting to treat gullies using integrated physical structures.

innovations, practices in Eastern and Central Africa

Over the last two decades or so, soil erosion, sedimentation and droughts have devastated the landscape in Eritrea making agriculture practically untenable. Crop yield per unit area has declined drastically. Through the ASARECA project, “Integrated management of water for productivity and livelihood security under variable and changing climatic conditions in ECA”, farmers in Molqi and Amadir watersheds have been implementing soil and water conservation innovations to manage and use water for agricultural purposes and to reclaim devastated soils. Arresting Erosion and reclaiming land at watershed level: Farmers worked with project staff to implement various innovations to protect catchment area.

The innovations include s and water conservation measures such as terraces, check dams and micro basin on hillsides. The hillsides have now been regenerated with exotic multipurpose trees, shrubs and grasses to check erosion. Farmers have worked with scientists to implement the following measures to make once degraded land

Farmers recover degraded Farmlands in Eritrea



Before



After

Terraces & checkdams, terraces & micro-basins constructed by farmers to check siltation of Molqi & Amadir dams in Eritrea brought about by erosion

once more productive:

- Constructing check dams and cropland terraces.
- Using improved seed and fertilizer to improve soil fertility
- Establishing simple and manageable drip irrigation facilities in organised groups and households to improve family income.
- Planting multipurpose trees and shrubs in the homestead to create mini-

climate as well as provide other wood and timber needs to the family.

- They have dug about 6,000 “tumbukiza” pits to harvest water and establish woodlots of drought resistant Eucalyptus trees. The woodlots have since taken off and are intended to provide raw material for the cottage “carving” industry planned for the two watersheds, besides conserving the environment.

Turning wastelands into food and livestock production areas in Kenya



Before intervention



Intervention



After intervention

In Kenya, working with project technical teams, the farmers have been able to harness water in what used to be a waste land. They have effectively converted wasteland into arable and good pasture with good

grass species, forage trees. This is now an ideal learning site for Kenya and the rest of the sub-region.

In the two Kenyan project sites of in Mwanja and Kalii watersheds in Machakos and Makueni Counties, about

60 farmers dug over 2000 pits after the training on pasture establishment and rehabilitation of wastelands using “tumbukiza” pits, this has released over 70 % of the household from food-secure.”

Farmers benefiting from weather forecasts

Mzee Jones Kameu Nzivo's homestead is a typical case of a progressive farmer. A kraal of healthy cows, goats and sheep, dozens of local variety chicken; and a store full of bags of various grains.

Until recently, the family of this 73 year-old was victim of poverty and hunger, a common situation in this semi-arid area of Kenya.

"All the products you see in this compound are results of good agronomic practices, supported with basic weather information provided to the farmers in a language they understand," Boniface Kioko, a senior agricultural officer in Machakos County explained. The Weather Based Agro-Advisories are part of the Improving Water productivity project of ASARECA.

The advisory, which varies from time to time, is a succinct summary of agricultural activities that ASARECA partners with the Ministry of Agriculture, Kenya Agricultural Research Institute, climate experts from Kenya Meteorological Department, and farmers have constituted to adapt to variable seasons. It enables the framers to make decisions based on predictions of rainfall partners and dry spells.

According to Machakos county meteorological department deputy director, Jackson Mwangangi; "Farmers are able to tailor crop management to expected conditions. Investments could be restricted during predicted bad years, and expanded when good rainfall – and thus good returns to crop investments – is forecast."

"Before 2010, we used to wait until the onset of rains before we planted maize," said Mzee Nzivo during a recent interview. "Now, we know when the rains will fall, and so, we plant early and the rain finds the seed already in the soil. If you wait for the rains to start, you risk losing a week or two. You cannot afford to do that in water deficit areas," he notes.

Since the introduction of weather advisories farmers have been discouraged from planting maize due to its poor performance in water deficient conditions. They have been trained to select drought resistant crops and practice mixed cropping.

Automated M&E system starts January



Mr. Enock Warinda, ASARECA M&E specialist explains the system

As part of ensuring effective planning, monitoring, evaluation, reporting and learning, ASARECA Monitoring and Evaluation Unit has introduced an automated system.

What it does

The system enables project implementation teams to participate

in data entry at the project level. The system allows the focal persons in the projects to enter the quarterly data into this web-based system.

The system contains data entry sheets, which reduce the rigor of manual tallying of all data in the Performance Monitoring Plan (PMP).

How it works

Once data entry is completed by the M&E focal persons, the principal investigator of the project, alongside other project implementation team players will view the datasets and make adjustments, before submitting to ASARECA theme coordinator (or programme manager). The coordinators will be allowed to view the datasets and discuss areas of concern, before eventually submitting to the M&E unit.

It is anticipated that the automated M&E system will enhance M&E activities within the ASARECA-member countries.

Environmental safeguards take shape

Since ASARECA intensified scrutiny of her development choices to ensure that they are friendly to, and improve the health of the environment, lots of good developments are falling into shape.

The Environmental Social Safeguards activities kicked off early this year with 20 ASARECA new projects and two of the old ones being subjected to review for compliance and screening. This process informed strategic planning on what needed to be done.

The review was a consultative process involving representatives of NARIs, Environment Management Agencies and ASARECA Program Managers. It was then updated in

preparation for the development and implementation of OPII. By October, all the sub-projects reviewed had been screened.

Projects are complying

As a next step, ASARECA conducted technical backstopping and monitoring visits on 17 projects to track compliance with mitigation measures agreed upon. Although some projects were experiencing difficulties, a majority are implementing mitigation measures. We provided training to a total of 162 people in ESS.

To engulf efforts of multi stakeholders in the region, ASARECA has initiated a network of environment officers in the sub-region to monitor ESS compliance in ASARECA countries.



**Mr. Tom Muga, Head,
Information and
Communication Technology
Unit, ASARECA**

Mr. Muga joined ASARECA recently as the Head of Information and Communications Technology (ICT).

Prior to joining ASARECA he worked with United States Agency for International Development (USAID) East Africa as Regional ICT Advisor. Tom holds an MSc degree in Information Systems from the University of Nairobi. Mr. Muga has extensive experience in designing and implementing ICT for development projects in the East Africa region.

He has managed projects in the East Africa region including ICT Capacity Development for Agricultural Research Institutions, Mobile Applications Development, Corporate Information Systems, Knowledge and Information Management for Institutions in the Agriculture Sector in East Africa.

He has made significant contribution in ICT policy formulation both at regional and national levels in the East Africa region.



**Esther Mbabazi, Assistant
Accountant, Finance
Management Unit, ASARECA**

Esther joined ASARECA Finance management unit recently as Assistant Accountant. Before joining ASARECA, she worked at Centenary Bank from March 2012 to June 2013. Mbabazi has a Bachelor's Degree in Commerce-Accounting option. She brings to ASARECA experience in interfacing with conventional banking and financial institutions.



**Moses Mumbya, Assistant Accountant,
Finance Management Unit, ASARECA**

Moses joined ASARECA Finance management Unit recently. Before he joined ASARECA, Moses worked mainly in various various organizations such as Kampala Motors Volcano Safaris, Empower African Child, Arise Africa, AES Nile Power limited among others. Moses brings to ASARECA extensive knowledge in computerized accounting environment, Resource planning and implementation. He has a degree in Finance and Accounting, diploma in business studies.



**Paul Jjombwe, Project
Accountant, Finance
Management Unit, ASARECA**

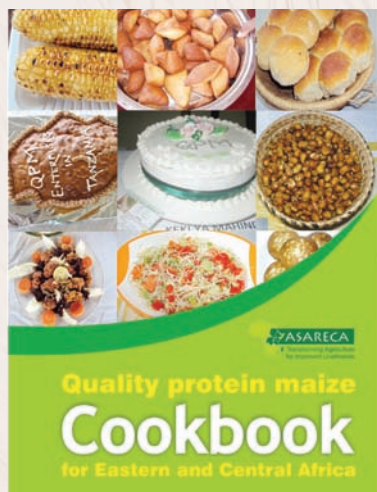
Paul joined ASARECA in April 2013 as a project accountant. Before joining ASARECA, he worked as a senior accountant with Maxwell

Stamp PLC., in the Ministry of Gender Labour and Social Development, Uganda.

This exposed him to work with various development organizations such as DFID, Irish AID, World Bank and UNICEF.

He has served as Financial Accountant with Inter Religious Council of Uganda, and Head of Finance, Action Aid Rwanda, among others.

Paul brings to ASARECA excellent knowledge in financial management and accounting. He has a Masters of Science degree in Development Finance from University of Stellenbosch, South Africa and Bachelors of Commerce degree from Makerere University, Uganda.



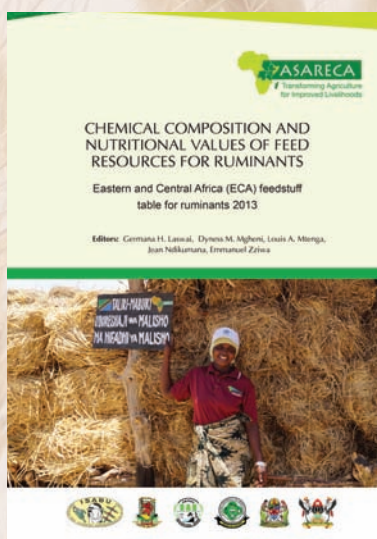
Title: Quality Protein Maize Cook book for Eastern and Central Africa

Authors: Zubeda Mduruma, Godfrey Asea, Stella Apio, Rose Ubwe, Regina Tende, Phyllis W Ngunjiri, Ivan Rwomushana and Fina Opiio

Published by: ASARECA

Year of publication: 2013

Synopsis: The Quality Protein Maize Cook Book (QPM) introduces delicious traditional recipes and ways to use QPM in combination with a wide variety of vegetables, legumes and other staple foods available locally in Eastern and Central Africa. It also introduces newly developed recipes. QPM adds to the nutritive value of the foods that are necessary for a healthy family whose staple food is maize. The book is also an attempt to introduce interesting QPM dishes found in one area to another area within ECA. Promoting such alternative uses of QPM can stimulate production and utilisation of this type of maize, thus improving livelihood of communities. **Available on www.asareca.org**



Title: Chemical Composition and Nutritional Values of Feed Resources for Ruminants: Eastern and Central Africa (ECA) table for ruminants 2013

Editors: Germana H. Laswai, Dyness M. Mgheni, Louis A. Mtenga, Jean Ndikumana, Emmanuel Zziwa

Published by: ASARECA

Year of Publication: 2013

Synopsis: Information on chemical characteristics and nutritional values of feeds is essential for formulating diets and developing optimum and economic feeding of livestock. The values quantify the energy and protein levels of feeds, mineral and vitamin contents. In Eastern and Central Africa (ECA), however, there is a colossal amount of data on chemical composition and digestibility values of tropical feeds which is scattered in local and international papers, research and students' reports. Such data are not user friendly to livestock stakeholders. The Feed Table, which is generated from an established Feed Resource Database in Eastern and Central African countries, summarises available information on chemical composition, digestibility and energy values of locally available feedstuff resources in the region. **Available on www.asareca.org**

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P.O box 765 Plot 5, Mpigi Road Entebbe, Uganda. Tel: +256 414 320556 Fax: +256 414 321126

Email: asareca@asareca.org; Website: www.asareca.org

Editorial Committee: Jacqueline Nyagahima - Head, Information and Communications Unit; Ben Moses Ilakut- Editor; Dr. Micheal Waithaka-Policy Analysis and Advocacy programme; Clet Masiga-Agro-biodiversity and bio-technology programme; Nelson Mukuria-Human Resources and Administration

All photos from ASARECA projects. All articles available on www.asareca.org

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