The AgriForum
Showcasing Agricultural Innovations

ASARECA
Transforming Agriculture for Improved Livelihoods

ISSUE 4

NOVEMBER 2011 - APRIL 2012

INSIDE THIS ISSUE

FOOD AND CASH
Local vegetables for nutrition, money

Page 4, 5

DARLING POTATO
Benefits of Orange Fleshed sweet potato

Page 8, 9

DROUGHT MAIZE
GMO maize research posts good results

Page 13

FIRST ASARECA GENERAL ASSEMBLY KICKS OFF

After months of preparations for the first ASARECA General Assembly, all is set. The General Assembly programme is out. The D-Days are Wednesday December 14, Thursday December 15 and Friday December 16. All delegates are set for this historic gathering of scientists, political leaders, social economists, farmers, businessmen and development partners. The media as well, is well mobilized.

▸▸ Page 2

From cover page

ASARECA First General Assembly is here

The theme of the General Assembly is; *Feeding Our Region In the first Century*. Below are some highlights of the papers that you should expect during the General Assembly week:

Agricultural science, technology, and innovation: Feeding Eastern and Central Africa in the 21st Century.

This paper will be presented by celebrated Professor Calestous Juma, of Harvard Kennedy School. The paper argues that feeding the region will require fundamental reforms in the structure of agricultural research to bring innovation to bear on raising agricultural productivity. This can be achieved through systemic links between research, training, commercialization, and extension. According to Juma, the region is dominated by fragmented approaches where these functions are carried out in separate institutions often under different ministries with weak linkages between the functions and among the institutions.

Managing current and future climate induced risk in Eastern and Central African Agriculture.

This paper will be presented by K.P.C. Rao, Principal Scientist, ICRISAT/ICRAF, Nairobi, Kenya. Among other issues, the paper notes that one of the main reasons for the low levels of adoption of improved technologies is that agriculture in the region is predominantly rain fed and hence highly vulnerable to uncertain and erratic distribution of rainfall. Rainfall during the crop season, especially in the semi-arid areas, varies from about one third to two and half times the normal amounts creating vastly different seasons with different possibilities. The paper warns that current variability and projected changes will have significant negative impacts on agriculture through changes in the growing environment

ASARECA Executive Director Dr. Seyfu Ketema and Uganda's Agriculture Minister Tress Buchanayandi officially launch activities for ASARECA GA

and in other parameters such as nutrient and water availability on which crop production depends. The paper shows that the situation can be mitigated using several available soil, water and crop management technologies and presents some of the available options that help in preparing for and managing climate risks.

Harnessing Livestock Resources for Food Security in the Pastoral Areas of Eastern and Central Africa

This paper will be presented by Polly Ericksen, Jan de Leeuw and Mario Herrero (International Livestock Research Institute, Nairobi, Kenya).
The paper tackles the challenges in the livestock production and productivity sector. The paper identifies five key issues:

First, the drylands are characterized by very high precipitation variability and droughts occur regularly, most recently every 3 to 4 years.

Media focuses attention to ASARECA

ASARECA senior managers at the launch

Second, the mobility that pastoralists have traditionally relied upon to manage in the face of such high climate variability is increasingly constrained by various forms of land expropriation and fragmentation, which exacerbates degradation in the accessible grazing areas.

Third, poverty and food insecurity are prevalent among ECA pastoral communities and are becoming chronic for some groups, especially those who have very low herd sizes or have "dropped out" of livestock production all together.

Fourth, although pastoralists have always participated in markets, this participation could be higher, more equitable and contribute more income to pastoral producers.

Fifth, little research has been done on improving pastoral livestock breeds or supporting species diversification.

Sixth, rangeland management studies and interventions are also lagging and

Buchanayandi (center) Media Centre boss Fred Opolot and ASARECA Deputy Executive Director Dr. Eldad Tukahirwa launch the GA events.

could contribute greatly to enhancing livestock productivity. The paper then outlines a strategy for "harnessing" the livestock resources of pastoral production systems as they have great potential to contribute to food security in ECA.

Other key papers

- Proven Technologies for Feeding the Eastern and Central African Region. To be presented by Professor Morris Ogenga-Latigo, farmer
- The emerging impact of CAADP as a planning and partnership platform to accelerate growth and poverty reduction among African countries. To be presented by Dr. Ousmane Badiane Director for Africa, International Food Policy Research Institute (IFPRI)
- High and volatile food prices: Drivers and impacts on food security in Eastern and Central Africa. To be presented by Joseph Karugia, Coordinator, ReSAKSS-ECA, ILRI
- Governance and Policy Imperatives for Transformation of Agriculture in Eastern Africa. To be presented by Godber W. Tumushabe, Executive Director and Policy Analyst, Advocates Coalition for Development and Environment

Other presentations

- The role of farmers, the regional farmer organisations and their strategic partners in feeding our region in the 21s century
- Emerging Issues underlying food insecurity in the ASARECA region
- The role of universities and their strategic partners in attaining food security in the eastern and central Africa region in the 21st century
- Role of Extension, the Regional Extension Associations, and their strategic partners in feeding the region in the 21st Century
- Role of the Private Sector, the Regional Private Sector associations, and their strategic partners in feeding the region in the 21st Century
- The East African Agricultural Productivity Program
- Overcoming seed potato quality constraints to tackle food security and poverty in Eastern and Central Africa in the 21st Century"
- Utilization of Beans for improved health and nutrition
- Crop-Livestock Integration for Sustainable Management of Natural Resources in Eastern and Central Africa
- Genetic engineering of maize for drought tolerance in Eastern and Central Africa
- Promoting sustainable natural resource management through effective governance and farmer-market linkages: Lessons and opportunities
- Evolution of seed sector policies in eastern and central Africa
- Promoting farmer-led seed enterprises of African indigenous vegetables to boost household incomes and nutrition in Kenya and Tanzania
- Improving capacity for Agricultural Research in Eastern and Central Africa: The SCARDA approach at ARC Sudan
- Harnessing Agrobiodiversity for Food Security and Sustainable Development: Conservation and Sustainable Utilization of PGR in Sudan
- Market-focused approach to Natural Resource Management: Potential for bee keeping in rehabilitation of degraded water sources and riverbanks, and biodiversity conservation: A case of Lushoto District, Tanzania.
- Productivity and profitability of groundnuts with phosphorus fertiliser in Mbale district, Uganda.

Article compiled by Information and Communications Unit and Capacity Development and Partnerships Unit. For more information, contact icu@asareca.org

Improving indigenous vegetable seeds to boost incomes

African indigenous vegetables contribute significantly to food security and nutrition for East African smallholder farmers. The vegetables, which include the African nightshade, Amaranths (which though not indigenous to Africa, is still considered an AIV), Crotalaria, Spider plant, Jute mallow and African eggplant, are rich in iron, zinc and provide half of Vitamin A requirements, especially for poor households.

Healthy vegetables

Indigenous vegetables also contain non-nutrient substances called phytochemicals which help protect people against non-communicable diseases. Generally, indigenous vegetables contribute to micronutrient consumption in a way that exotic vegetables do not.

However, the potential to meet the growing demand for these vegetables in the region is limited by lack of good quality seed. Although peri-urban communities grew vegetables to supply commercial up market outlets like super-markets and green grocery stores, they were frustrated by poor quality seed. Much of the seed was obtained from local open air markets and tended to have problems of purity, especially the mixing of different varieties through pollination.

Clean seeds are crucial

Farmers needed pure seed to meet the requirement of the market. But such clean quality seed was not adequate in the market. This undermined the quality of vegetables produced by farmers. In 2008, pilot efforts by the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the Centre for Biosciences International (CABI) and the Kenya Seed Company provided training to farmers on minimal use of pestcides, harvesting, seed extraction, and seed marketing.

The outcome of this effort was seed yield increased by about 60% to 70% for the farmers that participated in the training. Following up on this encouraging outcome, and in an effort to change the status quo of the sector, ASARECA in collaboration with CABI and other partners in Kenya and Tanzania initiated the project, "Scaling up farmer-led seed enterprises for sustained productivity and livelihoods in Eastern and Central Africa." This was at the close of 2009. The aim of the project was to evaluate three farmer-led African indigenous seed enterprise models to generate evidence-based and rigorously analyzed models for economically sustainable enterprises to improve seed production in the region.

A woman picks amaranth leaves for sale and for home use (cover photo)

The three models are:

1. The private sector seed company-mediated model: The farmers were linked to a private seed company, the Kenya Seed company, through its subsidiary, Simlaw, which is engaged in vegetable seed marketing in East Africa.
2. The research-mediated model. Under the model, the framers were organised in groups to work with a National Agricultural Research Institute to produce quality declared seed or certified seed. In Kenya the groups are working with the Kenya Agricultural Research Institute (KARI). They were given the KARI seed merchant certificate to operate because on their own, they have not yet qualified to have their seed certified.

In Tanzania, they are working with the Tanzania Official Seed Certification

The consumption of African indigenous vegetables (AIVs) in eastern Africa has increased tremendously over the last decade or so. In Kenya for example, research shows that AIVs now account for 30% of all vegetables sold. Through a private sector mediated farmer-led seed enterprises model, farmers are earning on average $4,500 per annum from indigenous vegetables seed production. One exceptional farmer earned up to US $ 17,000 in 2010.

AIV seed study plot

Farmers pick vegetables for sale in the market

Institute (TOSCI) and were able to produce and packag quality declared seed. As a result of these efforts, the farmers in the two countries have improved along the scale and could soon be registered to produce certified seed.

3. Informal grade improvement model: Here, seed is improved and distributed to farmers as distributed to farmers as foundation seed, which they sell in the open market. This has expanded the reach of quality seed to those who cannot get certified or quality declared seed.

Through the sale of quality seed, farmers' incomes have increased. A number of them have built permanent houses, while others have bought motorcycles and are able to comfortably pay school fees for their children some in secondary schools others universities.

Facts and figures

• A training curriculum was developed based on the identified needs for the farmer led seed enterprises. A training of trainers (ToT) course was carried out for 19 farmers (7 women) in Kenya and 10 farmers (3 women) in Tanzania. After the training, the ToT graduates conducted season-long farmers training in the identified project sites, in line with the cropping season and the stage of growth of the respective AIV seed crop.

Training for quality

• A total of 340 farmers (42.4% women) were trained in western Kenya. The farmers used the knowledge to improve their production of African nightshade, Crotolaria, Sunhemp and African eggplant seed.

• Besides the training, the project initiated the development of descriptors and bulking of foundation seed for Spider plant and Amaranthus to ensure sustainable supply of seed to growers who have no formal contracts with seed companies.

• Following the training on marketing and governance, two farmer groups, the Akikieun Vegetable Growers Group and the Korosiondet Kilimo Bora self-help group were formalised and registered as a community-based organisation to maximise economies of scale.

• Preliminary data for the private sector mediated model shows that a smallholder can profitably produce African indigenous vegetable seed. Forty five (35 male, 10 female) farmers are currently engaged in the model.

Farmers earn big

• In Kenya the farmers earned on average $ 4,500 per year from indigenous vegetables with an exceptional farmer earning as high as $ 17,000 per annum through the seed company mediated farmer led seed enterprises. More than seven farmers in Kenya are selling seed through the support of the private seed company mediated enterprises.

• From the training and inspection by the government seed certification agency, farmers in Dodoma, Tanzania the farmers are now producing and selling high quality seed. For example, the farmers are producing seed of African Eggplant with mean germination rate and seed purity rate of 94%; Amaranths with mean germination rate and seed purity rate of 92%; Nightshade with mean germination rate and seed purity rate of 99%. The seeds are in high demand locally and in Dar es Salaam and fetching good prices of about US$ 3 per kg.

Beneficiaries testify

• Mr. Hozea Orone a contract seed grower in Bungoma, Kenya, has built a permanent house from incomes earned from selling quality seed of Sunhemp, Crotolaria, night shade, spider plant and beans.

• Mr and Mrs Boazi Sebai quality declared seed growers in Kongwa, Tanzania spent Tsh 80,000 (US$ 47) for all expenses to grow, seed including buying improved seeds. They harvested 300kg of seed which they sold and earned a total of Tsh 750,000 (US$ 440). From these proceeds they are constructing a permanent house.

Article written by Information and communications Unit and Knowledge Management and Upscaling programme. For further information contact kmus@asareca.org

Empowering farmers to process Amaranthus for marketing

Amaranthus ssp. is one of the most consumed green vegetables in homes in Eastern and Central Africa. Amaranthus is used as leaf vegetables, grains, cereals, herbs, and ornamentals.

Regular use of amaranthus in the human diet provides us with vitamin A, B1, B2, and C, calcium, iron and potassium. It protects us from several disorders such as defective vision, respiratory infections, recurrent colds, retarded growth, premature ageing and sterility.

Amaranthus is a short lived annual herb, with erect and often thick and fleshy stems and leaves. In Rwanda and Tanzania, some farmers grow Amaranthus as a cash crop. The harvest is sorted out based on length, size and the number of leaves per stem. It is sorted to remove poisonous weeds and infected leaves and to pick out the best quality for the market.

An improved variety of amaranths ready for picking

A bowl of Amaranth soup

Nutritious leaves

One Amaranth plant can produce many nutritious leaves. Some varieties are capable of producing many kilogrammes of grain in one season. The tender leaves vary widely in colour from red, gold, purple and green depending on the species.

Value addition can take the form of steaming, stir-frying, preparation as fresh salad. The leaves can also be dried and milled into powder, which is used in combination with other food stuffs.

Previously, there was no processing of Amaranthus in Rwanda and Tanzania. This meant that its production was mainly for nearby markets and home consumption. Although the farmers had heard of the potential benefits of processing, they were bogged down by production constraints and lack of processing techniques.

In response, ASARECA and national partners funded the project; "Processing for commercial exploitation of selected tree-fruits and vegetables in Tanzania and Rwanda". The aim of the project was to empower small-scale Amaranth, mango, passion fruit processing businesses, especially those run by women, in using appropriate cost-effective technologies, improved quality assurance and market access.

Reducing post harvest losses

The project was informed by the understanding that improved pre and post harvest technologies reduce post-harvest losses; improve efficiency, product quality and availability.

Amaranthus is abundant during the rainy season and is scarce during the dry season. To ensure that quality amaranthus is available for processing, the project sought to work with the farmers in various ways, including hands on training.

In Tanzania, the project validated different techniques for drying Amaranthus and packaging it to ensure that it is available throughout the year.

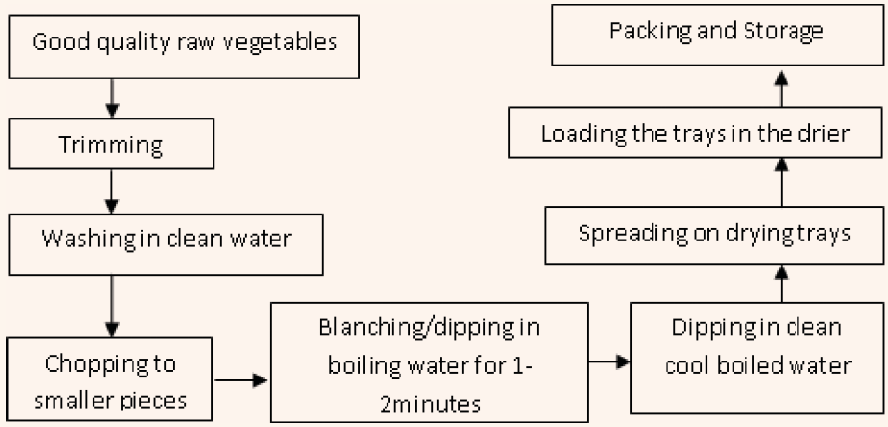
The dried products and packaging material were validated by over 1,000 consumers in Tanzania and improvements made based on the consumers' recommendations. The consumers included homes, university canteens, hotels and hospitals among others.

Three recipes that can be used to prepare cream of Amaranthus soup

A.

- 25 gms butter
- 250mls fresh milk
- 1 onion, chopped
- 2 cloves of garlic, chopped
- 40gms fresh, chopped tomatoes (or canned)
- 1 large potato peeled and diced 1mm thick

Simplified procedure of processing dried amarathus leaves



Regular use of amaranthus in the human diet provides us with vitamin A, B1, B2, and C, calcium, iron and potassium. It protects us from several disorders such as defective vision, respiratory infections, recurrent colds, retarded growth, premature ageing and sterility.

- 750 mls hot Amaranthus (20gms/l)
- Red pepper
- Spices of choice
- 15 gms Baobab
- Salt to taste
- Baobab is used to replace vitamin C lost during blanching, but, using too much will make the soup bitter.

B.

- 10 gms chopped onion
- 25 gms butter
- 1 big mashed potato
- 1 cup tomato sauce
- 5gms Red pepper
- 20gms carrot
- Spices of choice
- 20gms Amaranth
- Salt to taste

C.

- 25 gms butter
- 20gms Amaranthus
- 5 gms onion, chopped
- 1 cup tomato sauce
- 1 cup milk
- Spices of choice
- 15 gms Baobab
- Salt to taste

Directions:

1. Melt the butter. Fry the onions, and garlic
2. Add spices, cook for 2 minutes.
3. Add tomatoes, potatoes and carrots
4 Add hot Amaranthus
4. Bring mixture to a rolling boil,
5. Turn down heat and simmer for 30 minutes.
6. Stir occasionally.

The soup thickens as it cools, eventually becoming stew-like. Serve with bread or buns.

Article written by the High Value Non Staple Crops programme in collaboration with partners; Prof. Tiisekwa Bendantunguka, Department of Food Science and Technology, Sokoine University of Agriculture and Community Food Processing and Training Centre. For more information contact:hvns@asareca.org

IN BRIEF

Making forage seed available to farmers

Access to forage seed by farmers across Eastern and Central Africa for improved of pasture production is poor due to weak distribution and marketing systems. This is exacerbated by lack of capacity and knowledge by the farmers to bulk and conserve good quality forage seeds.

However, there is potential to increase forage seed production and supply through collaboration among research institutions in the region.

To tap into this potential, ASARECA in partnership with national institutions from Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda are implementing a project to develop management techniques for a range of forage species and to identify best zones for seed production for each species.

A total of 54 hectares across the eight countries have been committed to forage seed production. Already, forage seed for four grass and eight legume species have been bulked and given to farmers after training them on quality seed production. The project also invested resources to test various methods of improved seed production for selected pastures.

The methods included testing various fertilizer application rates, seed spacing at planting and cutting regimes after harvesting.

As a result, a number of agronomic practices on seed production of several forage species have been developed. 323 farmers (41 female, 282 male), have directly been equipped with skills and their capacity on seed production boosted.

This has led to a marked improvement of improved seed production. Over 10 tonnes of forage seed of different species have been multiplied and made available to farmers.

The darling orange fleshed sweet potato

Orange Fleshed sweet potato varieties are rich in beta carotene. These potatoes are a healthy and cheaper source of vitamin A for children and breast feeding mothers compared to relatively expensive sources such as fish, liver, milk and eggs.

Rich in Vitamin A

Research shows that just about 250 grammes of Orange Fleshed sweet potato can provide the recommended daily requirement for vitamin A. Vitamin A deficiency is a common problem in many parts of Africa, especially among young children and mothers. Vitamin A deficiency reduces disease resistance, impairs growth, increases mortality and can lead to blindness.

Vitamin A helps children to grow up free from diseases like night blindness and infections like measles and pneumonia. For adults, vitamin A is essential for a healthy skin and improves immunity and resistance to chronic diseases and prevents premature ageing. Orange fleshed sweet potato is also rich in carbohydrates which are necessary for energy, and vitamins B, C, and E, which help in recovery from illness.

Multiple uses

OFSP flour mixes well with wheat flour. Farmers produce and sell value added products such as cakes, doughnuts, mandazi, chapattis, biscuits, chips, crisps and juice and porridge made out of the flour. The potato leaves are prepared into delicious dishes rich in beta-carotene and vitamins C and B. In Rwanda, the nutritional values of OFSP attracted NGOs that work with people living with HIV/AIDS to promote the growing and consumption of these potatoes by the people it supports.

This cocktail of benefits, especially for women and children, who are most vulnerable to malnutrition, disease and hunger, motivated ASARECA and partners to initiate a project "Enhanced uptake and adoption of Orange fleshed sweet potato (OFSP) technologies", in 2008 to promote OFSP varieties and their associated production, processing and utilization technologies in Ethiopia, Kenya, Tanzania, Rwanda and Uganda.

The varieties were developed by the International Potato Centre in collaboration with scientists from the national agricultural research institutes in the region. The orange fleshed sweet potato technologies that are being promoted include improved varieties; crop management practices; and post-harvest management and processing to produce value-added products for people and for livestock feed.

Facts and figures

•Eleven preferred OFSP varieties and their agronomic practices were promoted. These are Ejumula, Kabode and Vita in Kenya; Ejumula, Kakamega, Vita and Kabode in Uganda; Ejumula, Carrot-Dar and Jewel in Tanzania; Caceopedo and 97-062 in Rwanda; and in Ethiopia virus free start up material has been taken from tissue culture for Tulla, Kulfo and Koka 12.

•Multiplication and distribution of clean planting material (vines) for the 11 improved OFSP varieties was initiated and by the end of 2009. An estimated 27 hectares was under OFSP multiplication either at primary multiplication stages or secondary multiplication stages. Approximately 7.4 ha in Uganda; 11.1 ha in Kenya; 2.2 ha in Tanzania and 6.3 ha in Rwanda. The secondary multiplication sites are managed by farmer groups with backstopping and monitoring from researchers from their national agricultural research institutes and extension and NGO staff.

Many farmers reached

•Nearly 10,000 farmers across the five countries have been reached by the project with planting materials and training on the technologies. Most of these farmers have started to grow and use OFSP. In Ethiopia and Rwanda, cleaning of selected varieties of OFSP to make them virus free using tissue culture and positive selection were initiated.

OFSP products

In Rwanda, multiplication of vines for two popular varieties - Cacearpedo and 97-062 led to 360,000 cuttings being produced from 1.6 ha of primary multiplication stages and 1,000,000 cuttings from 4.7 ha of secondary multiplication stages.

•In the western Kenya district of Busia, the Siwongo Drainage and Irrigation Self-help group, having received high beta carotene varieties; Kabode, Vita, Ejumula from the project, also got training by scientists from Kenya Agricultural Research Institute (KARI) and extension staff from REFSO, a backstopping NGO, on how to improve root quality


OFSP tertiary multiplication site

production. Before the training, the group did not have knowledge on best agronomic practices and value addition skills. This led to rejection of their products by the merging elite market.

Support makes impact

With support from ASARECA, the group received a manual chipping machine and a washing machine. With their own earnings, they were also able to put up a drying panel. They were linked to an NGO that provided marketing support and to a Nairobi-based flour distributor. As a result, their productivity and market access improved.

With time, the demand for OFSP flour increased from 200kg prior to the ASARECA intervention, to 300kg to 500kg at the close of 2009 per month, to 2 metric tonnes per month to date. Demand for chips also increased from 200kg per month to 2 metric tonnes per month. The number of farmers engaged in OFSP growing and enterprises likewise increased from 30 to more than 250 to date, hence improving the scale of household incomes by about 20%.

Consumption driving demand high

Motivated by improving linkages, high demand and income generation, the farmers in western Kenya have expanded the acreage of land under OFSP from an average of 0.125 per farmer to 0.25 acres per farmers. This in turn has occasioned increased production and sale of vines by about 30%.

In Kenya, for the last few years, the demand for orange fleshed sweet potato (OFSP) flour has increased from 500kg per month to 2 metric tonnes per month. Demand for chips has increased from 200kg per month to 2 metric tonnes per month. The number of farmers engaged in orange fleshed sweet potato growing, primary handling and enterprises has increased from 30 to more than 250. This has improved the scale of household incomes by about 20%.

The farmers used to store dried potato chips in unhygienic grass thatched houses. However increased demand for quality OFSP flour and chips in increased volumes overwhelmed their capacity to store dried chips in such structures. With support from the project, some of the groups constructed permanent storage units with a capacity of 3 metric tonnes. This has improved the hygiene in the handling and storage of OFSP chips and flour.

The next stage for these farmers is to install milling machines, modern packing machines and establish their own brands.

Beneficiaries testify

• Patrick Makoha, secretary for Siwongo Drainage and Irrigation Self-help Group, Busia, Kenya: "I started multiplying OFSP vines from less than a quarter an acre, but today, I have expanded to seven acres. I use all the products and by-products. For example, I use the potato peelings to feed fish at my fish pond and chicken. My neighbours also buy them to feed their poultry. On average I earn Ksh 30,000 (US$ 293.5) a month from the sale of the potatoes and Ksh 20, 000(US$ 195.7) monthly from the sale of vines. I have built a permanent house for myself from OFSP earnings and bought a second hand pick-up car, which has eased transportation of farm produce. My neighbours also benefit from the vehicle because they can hire it at a good rate to transport their produce. I comfortably pay school fees for my seven children."

• Pauline Okello, a farmer Gulu in northern Uganda: "I make lots of confectionaries using OFSP and Quality Protein Maize. I supply two supermarkets with short cakes, queen cakes, Bagia, doughnuts." This is corroborated by Evelyn Makorach, a shop attendant at Shell Gulu select shop: "She supplies all sorts of bakeries, which sell out within one two days. The cakes and doughnuts are the most preferred items. She earns Ush 21,000 (US$ 8) from 70 cakes, and UShs 35,000 (US$14) from 70 doughnuts that are sold daily."

• Angeline Ouma, member Siwongo Drainage and Irrigation Self-help Group: "The demand for OFSP flour is moving fast ahead of us. The Azuri brand, to which we supply, now demands one tonne every two weeks. The Kirinyaga Millers, also processors, demand a tonne every two weeks! We are currently unable to meet this escalated demand. We plan to supply vines to individual farmers whom we will contract to grow root to meet the demand."

Article written by Information and communications Unit and Knowledge Management and Upscaling programme. For further information contact kmus@asareca.org

Providing farmers appropriate livestock feeding information

Optimal feeding of livestock requires information on the nutritional value of feeds. Information such as energy, protein mineral and vitamin contents in the feeds, the presence of anti-nutritional factors and toxic substances is essential for diet formulation.

The information is also crucial in developing the best and most economic feeding strategies for farm animals at different stages of growth.

Correct information on livestock feeding is crucial for improvement of yields

Information burried in shelves

There is a lot of data on the nutritional value of tropical feeds in Eastern and Central Africa. However, the data is scattered in local and international papers, research reports, students' reports, dissertations, theses and in laboratory ledgers. Besides, this data, wherever it is stored, is usually not user-friendly. Therefore, key livestock stakeholders such as researchers, students, extension officers, livestock keepers, policy makers and feed manufacturers are unable to use it.

Against this background, ASARECA and partners initiated a project to develop a feed database and feed table by gathering, processing and availing information from different sources in the region. This information would assist the various stakeholders in the region in improving feeding and livestock productivity in the region.

Scientists collect data

A team of scientists from Burundi, Kenya, Rwanda, Tanzania and Uganda have already collected, compiled, collated, harmonized and documented the feed database. The database, in electronic format, is based at Sokoine University of Agriculture in Tanzania. ASARECA is in the final stages of uploading it onto the ASARECA website for wider dissemination.

In addition, a Feed Table with the nutritional data will soon be published by the ASARECA as a feedstuff booklet. The Database and Table have approximately 12,000 entries of about 200 different feed stuffs. These are categorized into four groups namely: roughage, concentrates, feed supplements and compounds for treatment of poor quality roughage.

The team noted many information gaps, while processing the data. The main gaps were noted on the parameters of the nutritional value of feeds collected. Efforts were made to fill the gaps by estimating values using prediction models.

Some values were borrowed from existing feed databases and tables. Some gaps, however, still exist. This calls for strategic feed analyses to generate the missing information and develop mechanisms for sustainable updating and maintenance of the database and table.

Regional and national institutional policy frameworks are required to smoothly operationalise the database. ASARECA and partners have already taken action to stimulate this process and this include training of 15 researchers (3 female and 12 male) from the participating countries on the principles and methods in developing the feed database and table.

The researchers have also been sensitised on the use of the feed table in feed formulation and budgeting. In addition, three young researchers from Tanzania were engaged on the exercise of developing the feed database and feed table. All the participating countries held training workshops for extension officers and students. In Tanzania, 27 (22 males and 5 females) postgraduate students were trained on the principles of feed formulation and the use of the feed table as a tool in feed formulation.

Some students and researchers who participated in the workshops are employing the ECA feed values, models and computer software on rationing animals in their research projects.

Participants get skills

A number of stakeholders in the livestock sector in ECA have been equipped with the relevant skills to use the Database and Tables. In addition, a training module on the use of the feed table, in combination with existing Decision Support Tools, in feed formulation for online learning has been developed. It is hoped that this will make a significant contribution to improved livestock feeding and subsequently better milk and meat production from livestock.

Article written by the Livestock and fisheries programme in collaboration with partners from the project countries. For further information contact: lfp@asareca.org

A bold step in sharing regional goods

The Plant Genetic Resources Unit of the Agricultural Research Corporation (ARC), Sudan has uploaded passport data of some potentially useful plant genetic resources accessions on the Eastern African Plant Genetic Resources Network (EAPGREN) data portal.

ARC has also made the information available on the internet (see link: http://www.arcsudan.sd/highlight/pgrparc.htm). This information has for long been stored in the ARC Gene bank documentation system, meaning, it was only easily accessible within ARC.

The implication of this development is that the EAPGREN countries can now easily share the information. Announcing the development, Dr. El Tahir Ibrahim Mohamed, the head of ARC Plant Genetic Resources Unit said, "We are happy that Sudan is sharing its plant genetic information with other EAPGREN countries and the rest of the world. This is a great achievement, which significantly adds value to the current plant genetic collections at national, regional and global levels."

According to the EAPGREN regional coordinator, Dr Abebe Demissie, the portal is meant to publish passport data of the documented accessions in EAPGREN countries to enhance germplasm exchange, information sharing and use of plant genetic resources. "Other EAPGREN countries are expected to upload their data onto the portal soon," Abebe said.

EAPGREN is a regional joint project coordinated by ASARECA to promote regional collaboration in the conservation and use of genetic resources in ASARECA countries by sharing information, using institutional comparative advantages, pooling resources and avoiding duplication of effort.

The member countries are Burundi, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan and Uganda. Each of the countries has EAPGREN national focal persons who perform national activities at national and represent the national

Coservation of plant genetic resources in Sudan

Conservation of plant genetic resources in Uganda

programme at the regional level.

Since it was established in May 2003 and operationalised at regional level in 2004, EAPGREN has developed substantial human and infrastructural capacities for effective conservation and sustainable use of plant genetic resources as part of the broader target of achieving food security, economic growth, sustainable agriculture and development.

Article written by Information and Communications Unit and East African Plant Genetic Resources Project

For further information, contact eapgren@asareca.org

IN BRIEF

Progress on crop safety efforts

A draft certification scheme intended to enhance the use of tissue culture application in Eastern and Central Africa is ready. The scheme complies with national and international standards and regulations to guarantee the quality of planting materials. This process involves assessing the risks, selection of clean-planting material, virus testing, micro propagation and tests for genetic fidelity. A certificate is only provided to the plants that are produced as per the directive of the scheme. This will enhance safe movement of germplasm of micro-propagated plants and promote sharing of genetic resources in ASARECA region.

ASARECA students finish MSc studies

Six of the eight, professionals sponsored by ASARECA in 2007 to study Mscs in Agricultural Information and Communication Management (AICM) have defended their dissertations. Through the Strengthening of the Capacity for Agricultural Research and Development in Africa project, ASARECA sponsored 34 students to study various agricultural research and development disciplines. Eight of the 34 undertook AICM at Egerton University, Kenya. They were from D.R. Congo, Uganda, Ethiopia, Kenya and Sudan. The AICM programme was developed by ASARECA to respond to the lack of skills in information and communication technology and information management to support agricultural research and development.

Reducing crop failure through Response Farming

In many parts of Eastern and Central Africa, farmers face varying rainfall patterns making it difficult for them to prepare for the next cropping season. The implication of this trend is that the risk of total crop failure gets higher by the day.

To survive in this predicament, farmers, especially in dry lands, have to make quick decisions and actions to realise reasonable yield in whichever rainfall pattern. Their decisions and actions help them to ensure effective supply and efficient use of water to optimise yield.

In the Central Rift Valley of Ethiopia, in particular, seasonal rainfall variability is the leading cause of irregular crop yield and many times total failure. Yet, amid this trend, climate change is likely to exacerbate rainfall variability.

Survival innovations

In response to this gloomy situation, farmers have developed a range of innovations to cope with the risks. The starting point is defining rainfall characteristics in terms of time of onset. In this case, the farmers have noted that rains that fall at the beginning of the planting season last longer and provide more water compared year-end seasons.

Based on this experience, the farmers tend to grow early maturing crops in the first and longer seasons, and plant long to medium maturing higher yielding crops. In the second or late season, they often switch to shorter maturing crops.

Avoiding total loss

Should the rains fluctuate in the first season, they quickly switch to medium maturing crops. In case both the early and medium maturing crops fail, they plant short maturing crops. The farmers have established that the first season is highly risky, but offers quite good harvest; so, they are willing to take the risk, but with some contingency at hand. The contingency comes in the form late season planting of short maturing crops, which offers fairly low risk of total failure. The yields in this season are generally poor. The farmers are aware of this. This

Farmers plan on how to cope with unreliable weather patterns

phenomenon is what is referred to as Response Farming. Response farming can therefore be defined as a set of strategic and tactical adjustments in cropping based on the amount of rainfall expected and actual amount received in the year. As illustrated in the farmers' model, response farming relies on forecasting amount of moisture from early rain occurrences. From this forecasts, farmers can to choose suitable crops and agronomic practices.

Timing and flexibility crucial

Response farming involves timing seasonal rainfall onset dates, monitoring actual rainfall, adjusting plant numbers, and deciding whether or not to add fertilizer as a base for pending season.

Realising the potential of response farming to mitigate the effects of climate change, ASARECA in partnership with the Ethiopian Institute of Agricultural Research, through the project "Making The Best of Climate: Adapting Agriculture To Climate Variability," conducted extensive field testing and verification in Ethiopia to demonstrate the usefulness of rainfall forecast for response farming adoption.

The exercise was conducted in two semi-Arid locations of Adama Marabe Marmarssa and Adami Tulu in the Central Rift Valley of Ethiopia. The feasibility of response farming was tested on-farm with 76 farmers during 2010 cropping season. Across all study sites, average maize yields increased by about 58% as a result of using response farming methods. Response farming therefore holds a big promise in reducing crop failure and increasing yield.

Tools for decision making

A portable rain-gauge and soil moisture measuring devices were used to narrow down to the dates when the approaching season starts. The rain gauge also measures the amount of rainfall from the onset to seedling season. These tools facilitate decision making in terms of choice of crop and amounts of variable inputs and second level decisions on whether the original crop should be maintained and if fertilizer should be added.

This could become handy tool for farmers to make strategic and tactical decisions, compared to the conventional large scale forecasts issued by meteorological departments.

From this processes and observations, Response farming is a kind of Plan A/ Plan B system, with Plan A geared for the higher yield potential and Plan B meant to minimise failures and reaping some reasonable yield.

Article written by Information and communications Unit and the Natural Resources and Biodiversity programme. For further information contact nrm@asareca.org

Regional scientists mulitiply nine GMO maize lines

Nine maize lines have successfully been transformed with drought conferring genes by scientists in eastern and central Africa (ECA).

This means that the genes that give a plant the capacity to withstand drought have been incorporated into nine maize lines. The nine maize lines are being multiplied in a screen house at Kenyatta University in preparation for confined field trials.

They are: two Ethiopian lines, three Kenyan lines, two Sudanese lines and two Tanzanian lines. They have been transformed with genes referred to scientifically as amiRNA1, amiRNA3, NHX1, PMI, XvPrx2 and CBF1.

In October 2011, a group of ECA scientists who are working on the ASARECA project, Genetic engineering of Maize for Drought Tolerance reviewed progress. The following advances in the research have been achieved:

• Production of transgenic maize seeds with a construct of a gene scientifically coded as PNOV- ASARAnxzm35 gene construct. The gene, also known as the ASARECA gene, was isolated from Maize egg cell. Plants with this genes show more resistance to water deficit. They are capable of returning to full recovery after drying up.

• Four genotypes (A188, CML144, Staha and Situka M-1) with genes isolated from Xerophyta viscosa Baker, which scientists refer to as a "resurrection plant", have produced seeds which will be used for further research. The genes were isolated from a desert plant, Xerophyta viscose. Plants with these genes tolerate drought by regaining their physiological functions after drought or as soon as there is some moisture.

The first insights into drought tolerance genes found in Xerophyta viscose were reported by a team of biotechnologists from the University of Cape Town, who observed the plant in its natural habitat and found it with capacity to survive months without water. And when it rained, the plant rehydrated completely and resumed its full metabolic functions within 24 to72 hours.

Miccah Seth, one of the Phd student in the core research team in a glass house studying the performance of Maize he transformed

• Maize lines of transformed CBF1 gene have produced seeds.

• Ethiopian and CIMMYT maize lines transformed with IPT gene have also generated the first set of seeds. Plants that over express the IPT gene are capable of enhancing tolerance to drought.

• A transgenic maize line has also been generated with enhanced drought tolerance conferred to it through silencing genes known as PARP1. In developing this line, the ability of maize to withstand drought is enhanced by blocking a gene called PARP1. PARP is a gene that is switched on to protect plants in stressful circumstances. This gene repairs the plant's DNA and shields its cells from damage. Unfortunately, the protein needs a lot of energy to do its job, and because plants can't predict how long tough conditions will last, they end up over-producing it. If the hard times persist, the plant eventually runs out of energy. Blocking PARP1 genes enables plants to use energy more efficiently and therefore drought tolerant.

ASARECA first reported a number of technological break-throughs in the search for a maize variety that can withstand drought. At the time researchers had successfully introgressed drought tolerance genes into the maize genome from the desert plant, Xerophyta viscosa, and a model plant species, Arabidopsis thaliana. Since then, concerted efforts towards mitigating the drought challenge have continued.

To enhance capacity in genetic maize research, ASARECA offered opportunities to students from Ethiopia, Sudan, Kenya and Tanzania to undertake PhD studies at Kenyatta University. The students constitute part of the core of the research team. The first phase of the project has just come to an end (September 30, 2011) with the production of the first phase of seeds of nine farmer preferred tropical lines for on farm confined trials.

A second phase of five years is required to advance these materials for commercial release. Once commercially released, and adapted by farmers, it is hoped that maize production in the region will increase by 70%, hence improving food security, reducing hunger and promoting economic development.

Article written by Charles Mugoya and Clet Wandui Masiga, Agrobiodiversity and biotechnology programme in consultation with the project team

For further information contact agrobio@asareca.org

The lighter moments

Each year, after spending months criss-crossing the region—monitoring and evaluating projects, meeting with stakeholders, conducting trainings, guiding and supporting project teams, partners and farmers, the ASARECA staff slow it down for party time. One such occasion earlier this year was unique. Two to three weeks to the D-Day, chits, each with a staff name inscribed, were circulated in a box. Each staff picked one at random. The staff whose name you picked would be your secret friend, for whom you were to buy a gift.

Each member kept their secret friend to themselves. Not even the friend knew who had picked their name. And then came the D-day. Everybody arrived at the venue with a nicely wrapped gift. It was tension, excitement and fun as colleague after colleague unwrapped their gifts and announced the recipient much to their surprise. What a wonderful way to facilitate team bonding and efficiency in a party atmosphere! The party went on well with lots of eats, drinks and dancing. Below are some of the highlights of the day

Fatuma, Zainab and Janet

The Cake

Eldad, Fatuma, Sam, Sylvia, and Zainab cutting the cake

Annet, Fatuma and Zainab

Racheal and Rose

in ASARECA

Pamela, Ursula, Musoke and Janet

Eldad and Nelson

Diana, Victoria and Adyeri

William and Sam

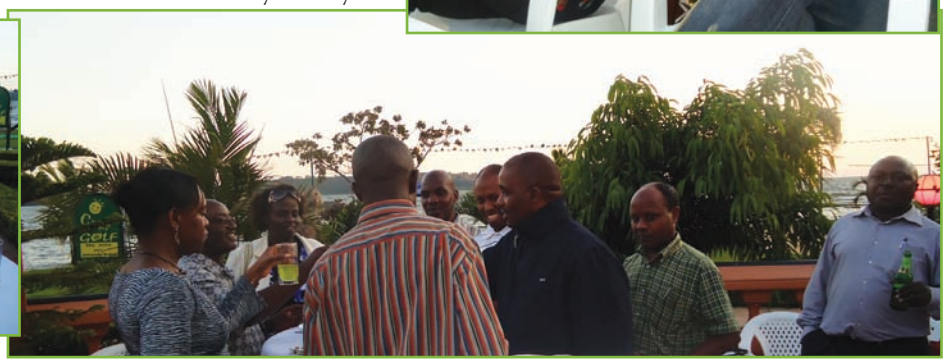
Ruth and Sylvia

Nelson and Fellix

Dan, Diana, Doris and Sarah

Cissy and Sylvia

Victoria, Diana, and Rose



Sarah, Eldad, Adyeri, Ivan, Mcharo, Nelson, John K, Michael and Itaza

The AgriForum

Showcasing Agricultural Innovations

ASARECA

Transforming Agriculture for Improved Livelihoods

Published by: Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
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

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