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Showcasing Agricultural Innovations

ASARECA
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BOOSTING CAPACITY FOR RESEARCH

In 2008 Mayada Beshir, from Agricultural Research Corporation (ARC) in Sudan, Michelin Inamahoro, from Institut des Sciences Agronomiques du Burundi (ISABU), and Leonidas Dusengemungu, from Institut des Sciences Agronomiques du Rwanda (ISAR), joined Makerere University to undertake masters' degrees in various agricultural disciplines. They were sponsored by ASARECA through the project on Strengthening Capacity for Agricultural Research and Development in Eastern and Central Africa (SCARDA-ECA). Mayada and Inamahoro are students of Plant Breeding and Seed Systems while Dusengemungu studies Agricultural Extension and Education.

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EAAPP: The big push for rice, wheat, cassava, dairy

The East African Agricultural Productivity Project (EAAPP) is on course. Conceived in 2009, the governments of all the four participating countries of Ethiopia, Kenya, Tanzania and Uganda this year signed agreements to implement EAAPP at national and sub-regional levels.

Ethiopia, Kenya and Tanzania have already launched the project and are implementing it. Uganda will launch soon following its recent endorsement by Cabinet and Parliament. Under EAAPP, the four countries undertake to establish Regional Centres of Excellence (RCoEs) for agricultural research by investing in commodities identified by ASARECA as being of sub-regional importance to mitigate food insecurity.

Kenya will be the centre of excellence for dairy, Uganda for cassava, Ethiopia wheat and Tanzania for rice. The countries have pledged to manage investment in these commodities to benefit the sub-region.

This is a positive development to ASARECA because RCoEs are an excellent opportunity for transforming the sub-region's agriculture from subsistence to an innovative, productive, commercially oriented and competitive agriculture through the agricultural value chain approach.

ASARECA and EAAPP seek to enhance collaboration of the National Agricultural Research Systems (NARS) to contribute to the AU/ NEPAD's CAADP Pillar IV which focuses on revitalizing, reforming and expanding Africa's agricultural research, technology dissemination and adoption.

ASARECA has offered to use its expertise in coordinating regional research for development, extension, training and education to facilitate spillovers of technologies and innovations that will be generated through EAAPP. Specifically, ASARECA plays the following roles in EAAPP:

ASARECA and EAAPP seek to enhance collaboration of the National Agricultural Research Systems to contribute to the AU/ NEPAD's CAADP Pillar IV which focuses on revitalizing, reforming and expanding Africa's agricultural research

Convening role

ASARECA is facilitating strategic meetings for the four countries to develop operational frameworks for RCoEs; defining the responsibilities of each RCoE to the sub-regional stakeholders; defining the mode of operation of the RCoEs individually and in relation to others; defining outputs and the manner in which they will be shared amongst participating countries and other countries in the sub-region, and facilitating the development of regional strategies for the four commodities.

ASARECA has already convened two planning workshops for these participating countries to agree on roles and responsibilities of each RCoE and the mode of operation of the RCoEs.

Networking

ASARECA will facilitate information sharing platforms to enable sharing of benefits and spillover of technologies and innovations developed by individual RCoEs to other participating countries.

Technical backstopping

ASARECA has over the years developed in-house expertise for out-scaling agricultural technologies, innovations and best practices; and so would like to put this expertise at the disposal of the RCoEs.

Monitoring and evaluation

Regional M&E activities will primarily focus on tracking the extent to which EAAPP is making spillovers happen across the sub-region.

Policy harmonisation

ASARECA pledges to facilitate the rationalization and harmonization of policies, procedures and regulations aimed at creating common standards in the participating countries. This will be attained by establishing the status of policies and procedures affecting the four commodities; analysing and developing policy options and advocating for and supporting implementation of the options.

Capacity building

ASARECA will organise and facilitate regional training workshops for managers of RCoEs to equip them with the tools and skills that will make them more effective research institutions.

Training role

ASARECA will collaborate with institutions and organizations that have expertise for training agricultural extension workers in undertaking the training.

Management and coordination

ASARECA has pledged to ensure the highest level of professionalism in managing EAAPP affairs and resources.

EAAPP is like a new baby in the house. ASARECA is paying deserving attention to this new-born. We will do all it takes in collaboration with the RCoEs to see the baby grow and live a complete lifespan.

Seyfu Ketema (PhD)
Executive Director ASARECA

The longer it climbs, the more beans

Climbing beans yield two to three times more compared to bush beans when grown on the same size of land. They also have better resistance to diseases, a longer life cycle and can recover from the effects of drought.

Beans are an important food crop in the diets of the populations in Rwanda, Burundi and the DR Congo. The common bean *Phaseolus vulgaris L* is their primary source of proteins (21%), carbohydrates (60%), vitamins and minerals (iron, zinc) (19%). The consumption of beans in the three countries is estimated to be more than 60 kg per person per year.

There are three major types of beans; bush beans, climbing and semi-climbing beans.

Numerous advantages

Besides efficient land use, climbing beans have better resistance to fungal foliar and root rot diseases, a longer life cycle and can recover from the effects of drought. However, to achieve expected output, climbing and semi-climbing beans require staking.

The woody sticks provide the strongest stakes but are susceptible to damage by termites. The sticks are also preferred by farmers for other alternative uses. Felling could lead to environmental degradation.

Coupled with this, incorrect market information and inadequate extension services have influenced farmers to accept the wrong perception that beans are a subsistence crop not worth investing in.

Consequently, the farmers have continued to grow poorly performing mixed bush bean varieties.

ASARECA responds

Against this background, ASARECA funded the project "Climbing Bean Intensification Systems" in the three countries.

An experimental plot of climbing beans in one of the project areas

The project aims at testing improved varieties on-farm, evaluating, identifying and intensifying best cropping systems and various staking methods to promote climbing beans. Ultimately, this is expected to increase productivity, improve nutritional value, increase household incomes and improve livelihoods of farmers in Rwanda, Burundi and DR. Congo.

Three national agricultural research institutions (NARIs) in the mentioned countries are participating in this project. These are Institut des Science Agronomique du Rwanda (ISAR), Institut des Sciences Agronomiques du Burundi (ISABU) and Institut National pour l'Etude et la Recherche Agronomique (INERA).

The NARIs recommended the use of improved climbing bean varieties enriched with micronutrients and protein for out-scaling. These varieties would provide the desired nutrients and mineral salts in the diets of the populations.

During the first quarter of 2010, ISAR released seven climbing bean varieties with a yield potential of 3.5 to 5.9 tonnes per hectare and two semi-climbers with a yield potential of 2.5 tonnes per hectare. ISABU released three climbing bean varieties with a yield potential of 1.2 to 3.0 tonnes per hectare.

Assessment of staking methods

The research evaluated different domestic materials such as tree shrubs and grass species and studied utilisation of banana fibre, sisal strings and branches of woody trees. The strong and straight woody species were seen to provide superior stakes.

Written by Dr. Mwamburi Mcharo and Maureen Katafiire, High Value Non-staple Crops Programme, ASARECA. For further information contact: hvns@asareca.org

From cover page

The three are part of the 34 young mid-level scientists from the region that SCARDA sponsored for an array of masters' degree courses including Plant Breeding, Soil Science, Agricultural Information and Communication Management, Research Methods, Range Management, Agricultural Extension, and Breeding. ASARECA hopes to see the scientists reach their full professional potential to contribute to the region's agricultural development. This year, 2010, the students complete their studies, and they have stories blended with joy, triumph, knowledge, empowerment—and a lot more—that they would like to share.

I can now release sorghum, beans and banana seed—Mayada

Mayada M. Beshir has been enormously exposed to new knowledge

Mayada M. Beshir joined the Biotechnology and Biosafety Research Centre of the Agricultural Research Corporation (ARC) in Sudan in 2006 as a Research Assistant Scientist and worked there until 2008, when she joined Makerere University for a masters' in Plant Breeding and Seed Systems.

Mayada did research on: "The Development of Molecular Markers for Introgresion of Resistance to Leaf Blight in Sorghum".

"Although Leaf Blight is not a very serious disease in Sudan, it is quite serious in East Africa and I know that it won't be long before it becomes an issue in Sudan," she states. Besides, Mayada is also aware that biotechnology tools for resistance against pests and diseases apply across geographical locations.

"The National Crop Resources Research Institute (NaCRRI), which I have been exposed to, is probably one of the best research centres in Africa. I have gathered lots of knowledge and I have met colleagues with whom I can collaborate in my future breeding efforts," she says.

Although Mayada specialised in Sorghum, she now has wealth of knowledge to take to Sudan, because she can now breed or do tissue culture for beans, tomatoes, bananas and sweet potato among others.

"I know the problems the rice breeders face because of interacting with them. I can now fit anywhere," she says. "I can now release seeds in all those fields because of my interaction with the Phd students at NaCRRI."

In the course of her studies, Mayada was nominated to spend two weeks familiarising herself with laboratories at the Biosciences eastern and central Africa (BecA) hub, which is a state of the art centre of excellence for research, located at the International Livestock Research Institute (ILRI) in Nairobi, Kenya.

During her stay at BecA, she associated with leading researchers like Dr. Dan Kiambi, a senior plant breeder in the region.

Mayada says she has plans to return to the BecA Laboratories for more exposure.

"BecA has a lot of facilities. My research is based on the development of molecular markers and the leaf blight disease. BecA has a well stocked laboratory, any young scientist needs to spend some in such a place for considerable time if they have to become good enough," she remarks.

In me, Burundi has got another breeder—Inamahoro

"When I return to Burundi, I will offer skills and useful contacts to ISABU management with a view to expand our research laboratories to produce more breeder seeds." This is Micheline Inamahoro's priority when she returns home.

Inamahoro got equipment and skills through SCARDA

Before she joined Makerere University in Uganda in 2008, Inamahoro was working at ISABU as an Assistant Research Scientist.

She was in charge of the tissue culture laboratory and greenhouse. "At ISABU, there are very few people with master's degrees; PhDs are even more scarce," she notes.

So, when Inamahoro was offered a scholarship under SCARDA, she saw her dream come true. "I was going to become one among the few Burundian agriculturalists to get a masters'," she states.

Inamahoro, however, had a personal challenge. "By September when the course was to start, I would be eight months pregnant," she explains. Nevertheless, she 'told herself', "Being a mother must never come in the way of a career woman; if anything, the two ought to be complementary in a woman's endeavour to live a full life."

Encouraged by her husband, Inamahoro travelled to Makerere to start the course. In November 2008, she gave birth to a bouncing baby girl, Lauria-Paõla, just when her first child back at home, was making one year and five months.

Inamahoro's second hurdle was the language barrier. Coming from a French speaking background, she could hardly speak English, yet the course was in English. She, however, learnt English on the internet and through the help of her lecturers and the community. Inamahoro now speaks English fluently. She has written her examinations in English and completed all the coursework. Inamahoro is looking forward to returning home with a two-year old baby, and a master's degree in Plant Breeding as the year ends.

As a student of Plant Breeding and Seed Systems and specializing in Marker Assisted Breeding, Inamahoro undertook research on: "Characterization and Genetic Mapping of Root Development and Resistance to *Radopholus Similis* in a Segregating Diploid Banana Population".

"I got some equipment and skills in micro and macro propagation of banana, Irish and sweet potato and I will use them at home," she asserts.

In addition to obtaining her degree, Inamahoro becomes part of a network of experts from Sudan, Rwanda, Malawi, Uganda and Kenya, who were fellow students, and with whom she can now collaborate. She accessed research facilities and equipment in some of the best institutions in Uganda and Kenya. "I had the opportunity to do research at IITA in Kenya, where I found Polymerase Chain Reaction (PCR) machines and markers for breeding. You cannot get this at ISABU," she notes. "I also travelled to South Africa for an international conference on "Science and Technology for Supporting Food Security in Africa".

In Kampala, I attended two international conferences on "Agro-biotechnology, Biosafety and Seed Systems in Developing Countries"; and on "Building Capacity for Improved Food and Livelihood Security in Africa."

The SCARDA project facilitated Inamahoro to buy *Wimo Rizo Pro,* a software for analyzing root development. "This is a crucial tool for a breeder, but it is not available in Burundi," she notes. "And the good news is—it was given to me for keeps!"

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I will expand innovation platforms in Rwanda—Dusengemungu

Leonidas Dusengemungu, another SCARDA sponsored master's student at Makerere university submitted a research paper titled: "Capacity for Sustaining Agricultural Innovation Platforms in Rwanda: A Case Study of the Research into Use (RiU) Project", in September 2010, in partial fulfilment of his studies.

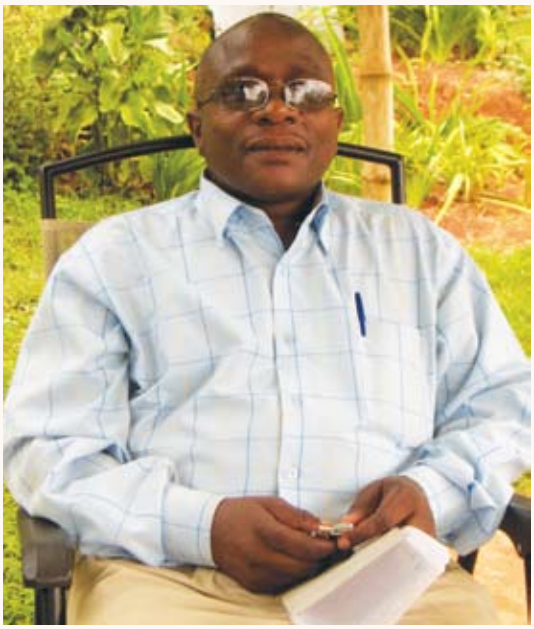
The paper partly analyses the needs of farmers, processors and extension workers in Rwanda. Dusengemungu hopes to apply it to scale out the Research into Use project in Rwanda. RiU is being implemented without a needs assessment. This is where Dusengemungu believes he comes in handy—to help to guide the project based on real needs.

Like all innovation platforms, Rwanda's RiU project brings together maize, cassava and potato farmers; and hillside irrigation stakeholders, traders and processors to pursue a common goal.

Before he was offered his a scholarship, Dusengemungu was the head of the technology transfer unit at Rubona, ISAR. He was involved in extension, rural sociology, planning, and monitoring and evaluation.

During his studies, Dusengemungu was introduced to the innovation platforms of the Forum for Agricultural Research in Africa (FARA), which are considered a model for participatory research on the continent. With this level of exposure, Dusengemungu hopes to influence the perceptions of farmers in the watersheds (villages where all a stakeholders work towards sustainable innovative approaches to natural resources management) to optimally use the land through best practices.

"I have met colleagues from Sudan, Zambia etc. and formed networks. Makerere was a melting pot of knowledge," he says. Like other



Dusengemungu learnt alot from FARA platforms in Uganda

SCARDA students, Dusengemungu received a laptop computer, which he will be allowed to take home.

Step in the right direction

The testimonies of determination and endurance by these career scientists demonstrate the hunger for new skills and knowledge that African people and institutions are experiencing to improve performance. The stories also highlight what capacity development can do to optimally deliver agricultural research outputs.

The SCARDA masters programme has been a step in the right direction. It was launched following an institutional assessment of the National Agricultural Research System, which indicated that lack of capacity was a major weakness in delivering research outputs to meet the needs of the poor.

Working closely with the DFID, FARA and the Regional Universities Forum for capacity building in Agriculture (RUFORUM), ASARECA identified the National Agricultural Research Institutes of Burundi, Rwanda and Sudan as the most appropriate for piloting the project in the ECA region.

The RUFORUM member universities participating in SCARDA are; Makerere University in Uganda; the University of Nairobi, Jomo Kenyatta University of Agriculture and Technology and Egerton University, all in Kenya; Sokoine University of Agriculture in Tanzania, and the Sudan Academy of Sciences.

Enormous benefits

Paul Gibson is the Resident Instructor for Plant Breeding and Statistics at Makerere University. He saw the students through the course and recommends it for other upcoming scientists.

"Students who attend universities in the region are more likely to benefit their countries because their appreciation of national and regional issues is boosted. We reinforce those values during the course," Gibson states.

Gibson also sees SCARDA students as agents of collaboration. "Universities find it hard to cooperate; the researchers are too busy to cooperate. Cooperation is possible for individuals that understand its benefits. SCARDA students appreciate the importance of collaboration," he asserts.

The project is funded by the Department for International Development (DFID) UK.

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Scientists list milestones in fight against striga

Striga infected sorghum

A spectacular striga-free sorghum garden in Sudan

Researchers in Eastern and Central Africa are counting a cocktail of milestones that have been scored in the fight to subdue the stubborn parasitic weed, striga hermonthica. Coordinated and financed by ASARECA, the scientists cite advances in identifying sources of resistance to striga using genomic platforms to fine map the quantitative trait loci (QTL) for striga resistance.

QTL refers to a gene affecting phenotypic variation in continuously varying traits. It is a useful tool for marker assisted breeding of sorghum for striga resistance.

Marker assisted breeding is an indirect selection process where a trait of interest is selected, not based on the trait itself, but on a marker that is linked to it. This development follows successful identification and validation 140 markers by breeders to be used to screen sorghum germplasm for striga resistance.

The researchers also successfully used markers to saturate areas with striga resistance on the sorghum linkage map. Saturation increases the chances of getting closer to actual genes conferring resistance to striga sorghum. Using 31 of these markers, the scientists selected 51 lines of sorghum that are resistant to striga. They crossed a donor parent, N13, with farmer preferred varieties in Eritrea, Sudan and Kenya. Following this, on-station and farmer field evaluation trials of these 51 lines for striga resistance have been conducted in fields that are either artificially or naturally infested with striga. They have shown high levels of resistance to striga parasitism and have agronomic traits that are as good as these of the parents.

These new varieties have a yield potential of up to 3.6 tonnes of grain per hectare. With the new striga resistant sorghum lines producing up to 3.6 tonnes/ha, there is a potential of raising sorghum production to 61.2 million tonnes on 17 million hectares of farm land that are threatened to be out of sorghum production due to striga infestation.

This breakthrough is a success story that will enable 300 million people in Africa who depend on sorghum as their unique food grain to be taken out of hunger and poverty and their livelihoods improved.

Speaking at a conference for researchers, sociologists and economists from the 10 ASARECA countries in the Sudanese capital, Khartoum, recently (October 25-28), experts agreed that more focus is needed to understand the precise locations of genes and their actions in controlling traits of interest.

ASARECA organised the conference to discuss ways of integrating available scientific tools to fight Striga and other biological and environmental constraints to sorghum. Participants highlighted the urgent need to evaluate the present sorghum lines for various technological and industrial applications. These include properties for milling, grain storage stability, starch content and baking.

Other considerations that need to be evaluated include product development, process and technology design, and business incubation for enterprises using sorghum as a major raw material. Also referred to as the witch-weed, striga is a major constraint to sorghum production in particular and cereal production in general. It is prevalent in semi-arid regions where continuous cropping as a result of population pressure has led to widespread soil infertility.

Drought has been linked to the flourishing of this unwanted weeds and survival of insects like the shoot-fly stem-borer and midge, and diseases such as smut and leaf blight. Sorghum is a major staple food for millions of people in the Eastern and Central Africa, but the production is still only 1.3 tonnes, which is far below the world's average of 4.5 tonnes per hectare.

Article complied by Dr. Charles Mugoya, Clet Masiga; and Information and Communication Unit. For more information, contact: agrobio@asareca.org

Cassava, potato playing-field and benefits set to expand

Opportunities for farmers in Kenya, Tanzania, Uganda, Burundi and Rwanda are set to expand following the gazetting on June 24, 2010 of standards for cassava and potato products by the East African Community (EAC).

This comes after a long consultative process by different stakeholders from the five EAC States. According to Dr. Michael Waithaka, the manager for Policy Analysis and Advocacy of ASARECA, farmers will benefit by using improved varieties and processing technologies to tap into the growing food market locally and internationally.

The process towards the development, harmonisation and gazetting of regional root crops standards (focusing on cassava and sweet potato) was spearheaded by the Uganda National Bureau of Standards (UNBS) in 2006.

UNBS compiled a list of 14 proposed standards, and using the EAC template, sent the list to the other four countries as zero drafts for consideration and adoption as regional standards.

This proposal was tabled before the EAC standards technical sub-committee and approved in a meeting on November 23-25, 2009 in Arusha, Tanzania.

ASARECA's role

ASARECA supported technical departments of the standards bureaus of Burundi, Kenya, Rwanda, Tanzania and Uganda to convene national consultative workshops to discuss the zero drafts in November to December 2009.

In early 2010, UNBS collated the comments and prepared them for discussion at a regional forum from March 22 -24, 2010, in Kigali, Rwanda. Participants included representatives from the national standards technical committees, the International Institute of Tropical Agriculture (IITA), the International Institute for Potato Research (CIP), cassava and potato researchers, and a representative of Uganda's parliamentary committee on agriculture and environment.

The following are the harmonized standards:

1. EAS 738: Fresh sweet cassava specification
2. EAS 739: Dried cassava chips – specification
3. EAS 740: Cassava flour – specification
4. EAS 741: Cassava wheat composite flour – specification
5. EAS 742: Food grade cassava starch - specification
6. EAS 743: Cassava crisps - specification
7. EAS 744: Cassava - determination of total cyanogens
8. EAS 745: Potato crisps - specification
9. EAS 746: Frozen potato chips – specification
10. EAS 747: Fried potato chips – specification
11. EAS 748: Fresh (ware) potato – specification

Eleven draft standards were presented to the East Africa Standards technical sub-committee at a meeting in Arusha, Tanzania from May 10-12, 2010. The committee recommended the adoption of the standards by the EAC Council of Ministers, which was done.

ASARECA's contribution to the standards dates back to 2006 when three ASARECA networks, the Eastern Africa Root Crops Research Network, the Eastern and Central Africa Potato Research Network and the Eastern and Central Africa Programme for Agricultural Policy Analysis (ECAPAPA), initiated a project to develop standards for root crops in the region.

The aim was to harmonise standards of root crops to allow the inclusion of cassava and potato products in the production of high value industrial products such as confectionery and animal feeds and promote trade in cassava and potato products.

Following the re-organisation of ASARECA, PAAP, the successor to ECAPAPA, continued efforts to harmonise the standards through the rationalisation and harmonisation project. This was aligned to ASARECA's cassava mega-project that was developed in 2008.

Why Cassava and Potato?

Cassava and potato have been identified as crops with a potential to spur poverty reduction and growth in

Cassava and potato products above: Harmonisation will regulate standards for cassava and potato products and increase benefits for the farmers.

Following the development, harmonization, gazetting and approval of standards for cassava and potato products, there will be a large market for these products from the region. Farmers will have to use available technologies to prolong cassava and potato shelf-life for export to the growing market

ECA. The New Partnership for Africa's Development (NEPAD), has launched a Pan African cassava initiative that seeks to tap the enormous potential of the crop for food security and income generation. Consequently, cassava has been prioritised as a strategic commodity in the Comprehensive African Agricultural Development Programme (CAADP) as a means of increasing food supply, reducing hunger and improving responses to emergency food crises.

Some of the factors constraining the realisation of the potential of root crops, including cassava and potato, include market failures manifested by the lack of key institutions and frameworks to enhance efficient marketing along the commodity value-chain. Most countries in ECA lack standards necessary for commercial utilisation of cassava and potato.

In addition, value-addition technologies, though well developed for some products, are still under-utilised due to a lack of clear guidelines on standards and supportive policies.

Cassava and potato are perishable, high-volume, low-value commodities in their raw forms. This undermines their place on the market. Processing would improve storability, reduce unit marketing costs and ultimately stabilise prices. Value addition through product development can enable farmers to access different niche markets. The good news is that technologies like waxing, fermenting, application of fungicides and storage in plastic bags offer the potential of minimising loses. When dried, chipped, or converted to toasted cassava flour, cassava has longer shelf-life allowing longer-distance marketing.

One of the major challenges for cassava producers and processors is access to markets and creating interest in new market opportunities. The opportunities include high quality cassava flour; improved and more convenient versions of traditional processed products; starch, sugar syrups; use in livestock feed rations; use for bio-ethanol production; and energy drinks.

High quality cassava flour is of particular interest because it can be used as a substitute for 10% of wheat flour in pies, pastries, cakes, biscuits, and doughnuts and has some industrial applications.

In order to enhance the value of cassava and potato, conducive policy frameworks that support commercialisation of these crops are necessary. According to the EAC Standardization, Quality Assurance, Metrology and Testing Act 2006; within six months of declaration of a standard, the partner states will adopt it as a national standard and withdraw any pre-existing national standard with similar scope and purpose.

Efforts are currently underway to support implementation of the standards at the national level.

Note: The standards were published in the EAC Gazette. 2010. Declaration of East African Standards. Legal Notice no. 22. Vol. AT. – 1. No. 007. Arusha 16th July 2010.

Article written by Dr. Michael Waithaka, Miriam Kyotalimye and Information and Communication Unit. For further information, contact paap@asareca.org

A basket of goods from Napier grass project

The molecular diagnostic tools for identifying Napier smut and stunt diseases that were developed by the ASARECA Napier grass project will soon be made available for use in ASARECA countries. This means the region is now better placed to conduct tests to ensure material is disease free before multiplication and dissemination.

The ASARECA Napier stunt and smut disease project was wound up in June 2010 after posting significant achievements. Funded by the African Development Bank (AfDB) and launched in June 2007, the project was initiated to fight the two notorious diseases, Napier smut, a fungal disease, and Napier stunt which are threatening to wipe out this important grass.

Napier smut and stunt diseases result into reduced plant biomass and are creating a shortage of feed, hence threatening the livelihoods of farmers who depend on Napier grass for dairy production.

According to Dr. Jean Ndikumana the manager of ASARECA Livestock and Fisheries Programme, unless the two diseases are controlled, they will undermine efforts to develop the small-holder dairy industry and affect economic stability and food security in the region.

Also called elephant grass, Napier grass, *Pennisetum purpureum,* is a tall fast growing specie averaging 3.5metres. In East Africa, it is planted on farms as a source of feed for dairy cows constituting between 40 to 80% of forages used by smallholder dairy farmers. In Kenya alone, about half a million smallholder dairy producers rely on Napier grass as a major source of feed and in Uganda, 90% of the farmers rely entirely on Napier grass as a source of fodder for improved dairy cattle.

Other than feeding livestock, Napier grass is also used for the management of stem borers as a trap crop, conservation of natural enemies of other potential crop pests and prevention of soil erosion.

Recognising the importance of Napier grass and the potential consequences of smut and stunt, ASARECA in collaboration with the International Livestock Research Institute (ILRI) in Ethiopia, and scientists from Kenya Agricultural Research Institute (KARI), the National Agricultural Research Organisation (NARO) in Uganda and the National Biological Control Programme (NBCP), Tanzania, worked together under the leadership of Dr. Jean Hansen to respond to the challenge.

The ultimate objective of the project was that the farmers adopt superior (resistant) clones and management practices to mitigate the spread of the diseases, leading to increased productivity.

A workshop to take stock of the achievements held on June 2-3, 2010 at ILRI in Adis Ababa, Ethiopia, highlighted the following achievements:

Promising clones identified

The project identified productive clones with good agronomic and nutritional traits to be promoted and outscaled in the region. This follows the completion of morphological and molecular characterisation, scoring for disease susceptibility and measuring biomass and nutritional quality in replicated trials for 120 clones in Kenya, 30 in Tanzania and 56 in Uganda.

The project also developed and validated molecular diagnostic tools to identify smut and stunt. These tools will soon be available to be used by ASARECA countries, especially those affected by smut and stunt. This means the region is now better placed to conduct tests to ensure material is disease free before dissemination.

Farmers are now keen to inspect crops regularly and remove diseased plants, keep Napier healthy by weeding and applying manure on their plots, use planting material from disease free areas and regularly monitor and report about the diseases

Farmers empowered

Aware that technology alone may not achieve much if farmers are not fully involved, the project emphasised farmer participation at all stages. Informed by this approach, the project developed and promoted best management practices to mitigate the impact of the diseases.

Farmers are now keen to inspect crops regularly and remove infected plants, keep Napier healthy by weeding and applying manure on their plots, use planting material from disease free areas and regularly monitor and report about the diseases. After using the management practices, farmers in Kenya, Tanzania and Uganda reported decreased disease incidence and subsequently increased milk production.

According to Dr. Jolly Kabirizi, a researcher with NARO, "Following surveys and farmer meetings, improved practices such as manure application, proper harvesting, weeding, roguing and use of clean planting materials led to the decrease of stunt incidence by 10% in Uganda."

Adopting best practices will increase the yield and quality of Napier grass

Policies to spread knowledge

Based on experiences, observations and facts spanning the project period, a number of proposals were developed and packaged. Out of these, a policy brief outlining management practices that are effective in controlling stunt and smut, and how to outscale the practices, how to facilitate cross-border movement of materials and how to protect genetic material that is propagated vegetatively will be produced.

Providing information

The scientists integrated the farmers into the research process by helping them to appreciate and adopt the alternatives. This approach formed a basis for raising awareness about the diseases, their impacts, symptoms and methods of control; and how to access resistant clones.

An aggressive campaign kick-started in 2009 developed several types of information resources for this purpose and used several channels to communicate the information to the target audiences. The resources included:

- Training materials on symptoms, causes, mechanisms of transmission and management of smut and stunt.
- Fact sheets on stunt, which were distributed to extension staff and NGOs during field days and agricultural shows.
- In Kenya, a handbook, "Symptoms, Causes, Mechanisms of Transmission and Management of Napier Stunting Disease", was produced in English and is being translated into Swahili. In Uganda, a handbook entitled, "Watch Out: Napier Stunt Disease Threatens Cattle and Goat Production in Uganda", was produced in English and translated into four local languages - Luganda, Luo, Ateso and Runyakitara.
- English and Swahili leaflets on the management of napier stunt disease were distributed during agricultural shows, farmer workshops, farmers' extension desks and field days in the three countries.
- Posters were also produced in English and Swahili to train farmers during farmer workshops, field days and agricultural shows.

The project activities were widely covered in newspapers, radio news and talk shows and television in the respective countries, and in national and regionally convened stakeholder workshops. Three documentaries were produced, a scientific paper was published in the Journal of Phytopathology in 2009, and a laboratory manual on diagnostics protocol was produced.

A publication on Napier grass stunt vectors was done and a project website, *http://sites.google.com/site/napiergrassdiseaseresistance/home* developed.

Correct attitudes evolve

Farmers were involved in the research through Napier grass sample collection and evaluation. As a result, a rare sense of interest and ownership emerged. The farmers now demand for tolerant materials, alternative forage and information.

Similarly, policy makers including political heads (ministers) picked interest along the way. They attended field days and major project events and promised to commit government funds to continue efforts to fight the threats to Napier. Consequently, stunt and smut diseases were included in the list of national priorities in the project countries.

According to Dr. Sarah Mubiru of ASARECA Livestock and Fisheries Programme, the achievements of the project were a result of teamwork and interaction of various stakeholders.

Article compiled by Livestock and Fisheries Programme and the Information and Communication unit. For further information contact: lfp@asareca.org, or visit www.asareca.org

Winning innovations

How a computer-based tool for feeding dairy cattle is set to change livestock productivity

July 22, 2010 will pass as one of the landmark days in the career of Dr. Sarah Mubiru. This is the day when before a gathering of over 700 delegates from the world over, Dr. Mubiru was announced the 1st Prize Winner of the Women in Science competition (2009/2010).

The occasion was the 5th African Agriculture Science Week and the Forum for Agricultural Research in Africa (FARA) General Assembly. The venue was Ouagadougou, the capital of Burkina Faso.

Amid loud applause, Dr. Mubiru, the programme assistant for the ASARECA livestock and fisheries programme, received a trophy, a laptop, US$5,000 and publications for the Technical Centre for Agricultural and Rural Cooperation (CTA).

The items were presented to her by the Director General of CTA, Mr. Michael Hailu, and the FARA board Chairman and Director General for the National Agricultural Research Organisation (NARO) in Uganda, Dr. Denis Kyetere.

Back home, ASARECA staff and management received the news with excitement. In spontaneous messages lasting over a week, colleague after colleague described Dr. Mubiru as a role model and an inspiration to young scientists, especially women. The ASARECA family organised a luncheon in her honour.

The award was in respect of an article; "Development of the 'ENDIISA' Decision Support Tool for Improved Feeding of Dairy Cattle in Uganda". She submitted the article for the Africawide competition organised by CTA, FARA, the Alliance for a Green Revolution in Africa (AGRA), Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), African Network for Agriculture, Agro-forestry and Natural Resources Education (ANAFE), and the NEPAD Planning and Coordinating Agency.

ASARECA Executive Director, Dr. Seyfu Ketema congratulates Dr. Mubiru

So what exactly is ENDIISA?

It is a computer based decision support tool with the capacity to generate feed combinations from 22 different feed types commonly used by dairy farmers.

The combinations and their costs can be generated for lactating cows weighing 350kg and above. The tool was named "ENDIISA" which in Luganda, a Ugandan dialect, means feeding. The tool logically combines types of feed based on their individual crude protein and metabolisable energy contents and their costs. As such, an option for a nutritious least cost feed combination for the cow is provided by the tool.

The three-step tool allows the user to:

- Select the feed types they have
- Enter the details of their dairy cow
- Enter the cost per kg of each feed type

After the third stage, the tool provides a result on the least cost feed combination for the cow. The combinations developed using the tool were tested on dairy cows on farms in Kayunga and Luwero districts in Uganda. Increases in milk production amounting to 24% were obtained from the test cows.

The tool was uploaded on the website, *www.naro.go/endiisa*, of the National Agricultural Research Organisation in Uganda to enable access by extension advisors, farmers, researchers and policy makers.

Why ENDIISA?

ENDIISA was developed to address the constraint of low milk yields among dairy cows. Dairy production makes significant contribution to incomes, nutrition and general livelihoods for a large number of households in Uganda. It contributes 54%-98% of household income for mixed crop-dairy farmers in the Lake Victoria crescent.

However, the performance of dairy cows was way below their potential with cross-bred (Holstein Friesian x Small East African Zebu) cows producing 2,400 kg of milk per cow lactation, which is about 50% of their potential.

The combinations developed using the tool were tested on dairy cows on farms in Kayunga and Luwero districts in Uganda. Increases in milk production amounting to 24% were obtained from the test cows.

Previous studies show that farmers provided only 59% of the minimum required metabolisable energy and 36% of the required crude protein to their cattle. Poor cattle nutrition resulting from inadequate feeds largely contributed to the low levels of milk production.

A stakeholder meeting in which farmers participated, identified lack of clear information on how to feed dairy cattle as the major cause of underfeeding. The farmers indicated that they knew about high value cattle feed resources, but didn't have information on the amounts to feed.

It was, therefore, clear that a mechanism to assist farmers get the right quantities of feeds to provide the nutritional requirements of their cows was important.

Brainstorming

A team of eight scientists (four female and four male) from the National Livestock Resources Research Institute, Makerere University, Kulika Charitable Trust, Uganda, Mukono Zonal Agricultural Research and Development Institute and the National Agricultural Advisory Services in a brain storming process agreed to develop a computer based decision support tool (DST).

Led by Dr. Mubiru, the team developed a proposal which won funding under the competitive grant scheme implemented by NARO. The team embarked on a five-step process including a baseline study; DST development; DST testing; DST uploading onto the NARO website and stakeholder feedback in the two dairy districts of Kayunga and Luwero in Uganda.

Publicising ENDISA

The team popularised the tool to improve livestock productivity. An article was published in the Ugandan print media and also online *http://newvisionuganda.info/PA/9/37/696956*; leaflets and a booklet summarising the tool for uptake was produced.

Besides, the software was circulated on USB disks to the major dairying districts to enable access to the tool even where internet access is still unavailable.

Award winning

The project achieved its objectives and is making a contribution in improving livelihoods of dairy farmers in Uganda. With the project successfully completed, Dr. Mubiru, with the team's consent, submitted an article on this work for the Women in Science competition.

After a rigorous screening process of the submissions by the organizers, Dr. Mubiru was among the nine finalists invited to present their work before a panel of judges. The panel's verdict: **Sarah Lubanga Mubiru is the First Prize Winner!**

Article compiled by Dr. Sarah Mubiru and Information and Communications Unit. For more information contact: lfp@asareca.org

The darling potato

Orange-fleshed sweet potato varieties provide a cheaper Vitamin A option for young children and non-breast feeding mothers compared to other sources such as fish, liver, milk and eggs. Its orange colour is such a charm!

In 2007, an Africawide programme known as Dissemination of New Agricultural Technologies in Africa' (DONATA) was conceived to facilitate the generation and dissemination of proven agricultural technologies to improve productivity, food security, incomes and livelihoods.

Among the technologies identified and found to have potential to make impact on livelihoods in eastern and central Africa and put forward for promotion under this programme were orange flesh sweet potato (OFSP).

The OFSP varieties were developed through several years of research by the International Potato Centre in collaboration with scientists from the national agricultural research institutes (NARIS) in ASARECA countries.

With financial support from the African Development Bank (AfDB), channeled through the Forum for Agricultural Research in Africa (FARA), ASARECA has since 2008 been promoting OFSP varieties and associated production, processing and utilization technologies in Ethiopia, Kenya, Tanzania, Rwanda and Uganda.

Rich in vitamins

The varieties are rich in beta carotene and have been proved able to provide a healthy and cheaper vitamin A option for children and non-breast feeding mothers compared to

OFSP cake and juice

relatively expensive sources such as fish, liver, milk and eggs. Research has shown that just about 250 gms of most OFSP varieties can provide the recommended daily requirement of vitamin A for children and non-breast feeding women.

Protecting Children

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 our 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 us to recover from illness.

Orange fleshed sweet potato can be mixed with other foods like wheat flour in baking or processed into crisps and juice. The leaves can also be processed into delicious dishes rich in beta-carotene and vitamin C and B.

Scaling out the benefits

Given these benefits, ASARECA sees orange fleshed sweet potato as a crop of hope—that will contribute to reduction of malnutrition and hunger in the region. Orange fleshed sweet potato technologies include improved varieties, crop management practices like how to plant and weed, and post-harvest management and processing to produce value-added products for human consumption and for livestock feed.

11 varieties up for the region

ASARECA is promoting 11 preferred orange fleshed-sweet potato varieties and their agronomic practices in the region. In Kenya, Ejumula, Kabode and Vita; in Uganda, Ejumula, Kakamega, Vita and Kabode; In Tanzania, Ejumula, Carrot-Dar and Jewel; and in Rwanda, Caceopedo and 97-062.

In Ethiopia, virus free start-up material has been taken from tissue culture for Tulla, Kulfo and Koka 12. Multiplication and distribution of planting materials for the 11 improved varieties was initiated within Innovation Platforms for Technology Adoption. By the end of 2009, about 27 hectares was under OFSP multiplication in East Africa.

According to Dr. Lydia Kimenye of ASARECA, as more clean planting materials of the treasured potato varieties become available, the potential to spread the benefits of orange fleshed sweet potato keeps growing.

Article written by Knowledge Management and Upscaling Programme and Information and Communication unit. For more information contact: kmus@asareac.org

ASARECA Executive Director Dr. Seyfu Ketema

ASARECA Deputy Executive Director Dr. Eldad Tukahirwa

Some of the ASARECA staff during a team building retreat at Nile Resort Hotel in Jinja early 2010

Title: Snap bean recipes.2nd Ed

Authors: Festo S. Ngulu, M.Simlowe.

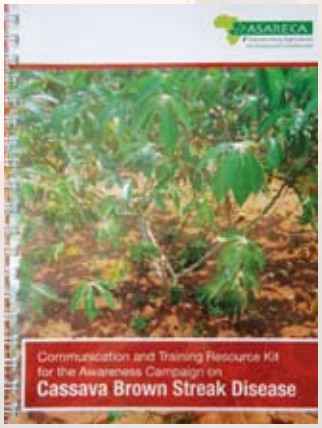
Edited by: C. L Yangole

Published by: Selian Agricultural Research Institute, Arusha, Tanzania in collaboration with ASARECA and East and Central African Bean Research Network (ECABREN)

Year of Publication: 2009

Synopsis: Unlike dry bean, snap bean is relatively new in the region and is grown mainly for export. Its consumption at household level is therefore very low. In response to this challange, the booklet is meant to promote the consumption of snap bean in Eastern and Central Africa by providing potential customers a range of recipes that satisfy their tastes and preferences. A swahili version of the book is also available

Copy will be available on www.asareca.org soon



Title: Communication and Training Resource Kit for the Awareness Campaign on Cassava Brown Streak Disease

Compiled by: ASARECA

Year of Publication: 2009

Synopsis: Cassava brown streak disease (CBSD) is spreading rapidly and threatening to collapse the cassava industry if not urgently controlled and managed. It is for this reason that ASARECA, with funding from USAID, came up with the book as a resource kit for the campaign to create awareness about CBSD through dissemination of information on the disease. The book contains a wide range of training resources including leaflets, posters, banners, a manual guide, a policy brief, car stickers, billboards, videos, an image library, guidelines on how to use mass media in the campaign, and how to help stakeholders in the cassava sector to understand the disease and control its spread.

Copy available on www.asareca.org

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All photos from ASARECA projects.