ISSN: 2073-9699 VOLUME 4 ISSUE 11– NOVEMBER 2010

RUFORUM MONTHLY

The Monthly Brief of the Regional Universities Forum for Capacity Building in Agriculture

USA FUNDS USA-AFRICA UNIVERSITY PARTNERSHIP

The Association of Public and Land-grant Universities (A-P-L-U) and Higher Education for Development (HED) on September 2010 announced the awarding of 11 partnership grants of about $1.1 million each to universities in Africa and the United States to address national and regional priorities in sub-Saharan Africa. Each partnership is focused on developing collaborative research and academic programs to build the capacity of the African and U.S. institutions to affect change in Africa. The 11 grants included;

1. International Institute for Water and Environmental Engineering (Burkina Faso) and Tuskegee University (AL) working on Water and Environmental Technology
2. Addis Ababa University (Ethiopia) and the University of Connecticut addressing Sustainable Water Resources Development and Management
3. University of Ghana's College of Health Sciences and Brown University (RI) working on Higher Education Initiative for HIV/AIDS
4. Kenyatta University (Kenya) and Syracuse University (NY) addressing Building Capacity through Quality Teacher Preparation
5. University of Nairobi (Kenya) and Colorado State University working on the Sustainability of Drylands
6. University of Liberia and Indiana University, Bloomington developing a Life Sciences Planning Initiative
7. University of Malawi's Bunda College of Agriculture and Michigan State University's Chancellor College working on Ecosystems Services: Linking Science to Action in Malawi and the Region
8. Université Gaston-Berger (Senegal) and The Ohio State University working to Develop a West African e-Education Agro-ecology Program for Sustainable Food Production
9. University of Cape Town (South Africa) and University of Cincinnati working on Solar Energy Devices for Africa
10. Catholic University of Sudan and Virginia Polytechnic Institute and State University are Rebuilding Higher Education in Agriculture to Support Food Security, Economic Growth, and Peace Efforts in Post-Conflict Southern Sudan
11. Makerere University (Uganda) and North Dakota State University are addressing Capacity Building in Integrated Management of Zoonoses and Vector-borne Diseases in Eastern and Central Africa

RUFORUM thanks A-P-L-U for securing this support and congratulates all the winning institutions.

- *RUFORUM Monthly provides information on activities of the Regional Universities Forum for Capacity Building in Agriculture.*
- *This Monthly Brief is available on the last week of every month* ■

ANNOUNCEMENTS

Re-tooling Training Workshop for Research Methods, 7-11 February, 2011 Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya.

E-learning Content Development writing Retreat for Bunda College of Agriculture, Malawi, Egerton University, Kenya, Haramaya University, Mekelle University and Jomo Kenya University of Agriculture, Kenya, 7-15 January, 2011, Addis Ababa, Ethiopia.

More information on RUFORUM activities can be accessed on the RUFORUM BLOG at http://ruforum.wordpress.Com **and the RUFORUM Website at** www.ruforum.org

For more information about the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), Contact: The **Newsletter Editor**, RUFORUM Secretariat, Plot 151 Garden Hill, Makerere University Main Campus, P.O. Box 7062, Kampala, Uganda. Fax: +256 414 534153; Tel: +256 414 535939; E-mail: secretariat@ruforum.org; or visit RUFORUM Website at www.ruforum.org.

RUFORUM Capacity Building in Agriculture

TRAINING A NEXT GENERATION OF AGRICULTURAL SCIENTISTS FOR AFRICA: A PARTNERSHIP PROGRAMME BETWEEN MAKERERE UNIVERSITY AND PUBLIC-PRIVATE SECTOR

Above: Dr. Richard Edema is among the first group of MSc graduates trained under FORUM/RUFORUM at Makerere University. After wards he did his PhD in the USA with support from the Rockefeller Foundation. He is currently a Senior Lecturer at Makerere University where him and his colleague Dr. Patrick Okori are leading the Plant Breeding and Biotechnology Graduate Programme. Between them they have trained over 40 MSc and 6 PhD Students.

There is urgency today to rebuild and expand Africa's human resource base to address its daunting challenges of especially poverty, food and nutritional security together with the emerging crises being brought about by climate change, demand for new sources of energy and competition for scarce water and land. African Universities are currently reforming their curriculum to develop a cadre of well trained professionals to support Africa's development agenda. At Makerere University's College of Agricultural and Environmental Sciences, we have, for example, redesigned some of our graduate programmes to better place them in the region's development context. Currently, one of the challenges facing several countries in the region is the need for scientists to develop and produce high yielding crop varieties suited to different environments and market niches. Equally important is the need to make these improved seed reach the end users, and where feasible feed into existing farmer seed systems. Thus the challenge to Makerere has been to redesign its Plant Breeding graduate programs. The first objective was to ensure the students have strong technical knowledge so they fully understand the science needed to produce new varieties. Second, the graduate students needed to be exposed to 'real world' plant breeding programs so that they comprehend the many practical obstacles which need to be overcome to produce new varieties. Finally and importantly, the students are required to build their competence and understanding of the processes needed, not just to develop a new variety, but also to get the improved seed to the market, and eventually to the consumer.

We thus had to establish from stakeholders the profile of the graduates the markets needed. We used the information to redesign the curricula to train such graduates. We consulted not only in Uganda but also with other stakeholders in Eastern, Central and Southern Africa. Importantly, we learned that producing such a graduate needed other partners outside the university so that we could build in activities such as field attachments to existing national plant breeding programmes and some of the private seed companies. Both faculty staff and graduate students had to take internships with the Uganda National Agricultural Research Organisation Plant Breeding Programmes, especially at the National Crop Research Institute at Namulonge. We also partnered with some of the CGIARs in Uganda and attached the graduate students to their programmes. To learn how seed systems worked we linked with private seed companies such as Victoria Seeds for field attachment to their firms, and the Uganda Farmers Association linked us to farmer groups to learn about their seed systems. To further enrich our training, we invited guest lecturers from as far as Kenya, USA and Zimbabwe.

This has been an exciting experience for us. First, we designed two holistic plant breeding programs including both MSc and PhD so that both programs fed into each other. We were able to receive students from as many as 8 countries, with different language backgrounds. We found it necessary to include, apart from the biological sciences, strong elements of social sciences (including marketing and program management), and provision of other skill enhancement training especially research methods and communication skills. Our crop of 21 MSc students (see following pages) has completed their studies (and a new intake will start in February 2011) and the PhD students (22) are due to complete in 2012. We are using the experiences and lessons to support other curriculum reforms at Makerere University.

STUDENTS WHO HAVE COMPLETED THEIR M.SC. COURSES IN PLANT BREEDING AND SEED SYSTEMS, CROP SCIENCE, SOIL SCIENCE AND AGRICULTURAL EXTENSION UNDER AGRA AND SCARDA SUPPORT AT MAKERERE UNIVERSITY (2008-2010 COHORT)

MSc students under AGRA support-- 2008-2010 (10 students)

Kwemoi Daniel Bomet (Uganda).
Assistant Maize Breeder/NARO: Characterization of a diverse set of maize germplasm for resistance to infection by *Aspergillus flavus.*
Cooperator: NARO/NaCCRI Maize breeding program.
Key results: Improved method of quantifying Aspergillus infection. Identified good breeding materials with resistance. He has joined the National Breeding program and is due to start PhD training on 2011.
Email contact: kwemoi2000@yahoo.com

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Nsabiyera Vallence (Uganda).
He evaluated performance, mophological diversity and combining ability of some hot pepper genotypes in Uganda.
Cooperator: NaCCRI
Key results: Documented agronomic and morphological characteristics of local and externally acquired germplasm of hot pepper, as a starting point for pepper breeding in Uganda.
Email contact: nghmvallence@yahoo.co.uk

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Namugga Prossy (Uganda).
Potato breeding and biotechnology, NARO,Kabaale. Comparison of S1 and S2 lines from Longe 4 Maize for heritability, genetic variation and relationship of secondary traits to yield under low and optimal N. Cooperator: NARO/NaCCRI Maize Program
Key results: Improvement of Longe 4 early maturing OP maize variety for tolerance to low-N. Refined breeding strategy for population improvement for tolerance to low-N. Prossy is now working as a research scientist at Katyengene (ZARDI) and hopes to embark on PhD study after one year of work with the National Agricultural Research Organisation (NARO).
Email contact: namugg-prossy@yahoo.com

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Namazzi Birabwa Sylvia (Uganda).
Genetic analysis for drought tolerance in selected upland rice genotypes in Uganda. Cooperator: NaCCRI
Key results: Differences were detected in genotypic response under drought. Methods of drought screening were improved. She plans to start her PhD in 2012. Email contact: bira8000@yahoo.com

Ongom Patrick Obia (Uganda).
Research Assistant, Makerere Regional Graduate Programs in Plant Breeding: Inheritance of resistance to *Fusarium* root rot in three common bean genotypes.
Cooperator: NARO/NaCRRI bean breeding program
Key results: Validated a molecular marker for *Fusarium* resistance. Demonstrated that *Pythium* and *Fusarium* resistance were inherited independently in this cross, contrary to the widespread assumption of co-inheritance of these two resistances. Contributed to the knowledge of inheritance of *Fusarium* resistance in released bean varieties in Uganda. He is due to start his PhD in 2011.
Email contact: ongom_patrick@yahoo.co.uk

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Obala Jimmy (Uganda).
Lecturer, Bukalasa Agricultural College: Improvement of resistance to *Fusarium* root rot through gene pyramiding and validation of SSR pvbr87 marker in common bean.
Cooperator: CIAT bean breeding program, Kawanda.
Key results: Double-crosses involving 4 resistance sources produced more resistant progeny than single-crosses, and transferred that resistance more effectively to susceptible varieties. Produced lines that could become released cultivars.
Jimmy has applied for the PhD Plant Breeding Programme at Makerere University and hopes to start studies in 2011. Email contact: obalanef@yahoo.co.uk

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Nyombayire Alphonse (Rwanda).
ISAR, Maize breeder: Combining ability and genotype by environment interaction of selected maize inbred lines for performance under low nitrogen levels and drought stress.
Cooperator: NaCCRI
Key results: Selection in both optimum environments and stressed environments is more effective than selection in either environment alone in order to improve performance under stress. Some hybrids yielded above average in both stressed and optimal environments.
Alphonse is back in Rwanda working as a maize breeder at Nyagatare station.
Email contact: nyombaip@yahoo.fr

STUDENTS WHO HAVE COMPLETED THEIR M.SC. COURSES IN PLANT BREEDING AND SEED SYSTEMS, CROP SCIENCE, SOIL SCIENCE AND AGRICULTURAL EXTENSION UNDER AGRA AND SCARDA SUPPORT AT MAKERERE UNIVERSITY (2008-2010 COHORT)

Shumbusha Damien (Rwanda).
ISAR/Sweetpotato breeder Diallel analysis of sweetpotato for dry matter content.
Cooperator: NARO/NaCCRI sweetpotato program, CIP-Kampala
Key results: Demonstrated that crosses of low dry matter content (such as orange-fleshed Jewel) with high DMC local varieties (such as KYA), can give F1 segregants that combine high Dry Matter Content (DMC) and high yield. Generated useful breeding material. He helped refine crossing and selection strategy for sweet potato breeding. He has already resumed work with ISAR.
Email contact: shudam@yahoo.fr

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Ndacyayisenga Theophile (Rwanda).
ISAR, Potato Breeder Inheritance of resistance to potato late blight, *Phytophthora infestans.*
Cooperator: NARO, CIP-Kampala
Key results: Improved systems of predicting crossing success in potatoes. Characterized new introductions with late blight resistance for their disease reaction and agronomic performance in Uganda. He is back in Rwanda and has initiated a potato breeding program.
Email contact: theophillo@yahoo.fr

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Habarurema Innocent (Rwanda).
ISAR, Rice Breeder: Mode of inheritance of resistance to bacterial blight in rice (In preparation). Cooperator: NARO
Key results: Characterized the inheritance of resistance to bacterial blight in rice varieties recently released in Uganda (NERICA series). Generated breeding materials that have potential to provide both high yield and resistance to bacterial blight. He has returned to Rwanda to start a rice breeding program.
Email contact: habaruremai@yahoo.fr

MSc student Crop Science under AGRA support-2007/10

Onaga Geoffrey (Ugandan).
NaCRRI, Rice Plant Breeder: Characterization of Lowland Rice varieties for tolerance to Iron Toxicity in Uganda".
Cooperator: NARO/NaCCRI
Key results: Tolerant lines to Fe toxicity exist that maybe under different mechanisms. This needs to be elucidated further. Email contact: onafrey@yahoo.com

MSc Plant Breeding Students under SCARDA support--2008-2010 (6 students)

Lado Maurice Mogga (Sudan).
GOSS/Plant Breeder/Yei Expt. Stat.
Research Coordinator: Inheritance of resistance to rice yellow mottle virus disease in selected rice cultivars in Uganda. Cooperator: NARO/NaCCRI
Key results: Inheritance of resistance in NERICA crosses may involve multiple genes and/or epistasis. Heritability was relatively high, thus selection for resistance in segregating material should be effective. A substantial reciprocal effect was observed in some crosses, and should be studied further. Three independent molecular markers associated with resistance were identified. Moga has national returned to southern Sudan where he is heading a seed project in Southern Sudan.
Email contact: mauricemogga@yahoo.com

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Beshir Mayada Mamoun(Sudan).
Sorghum breeder, Agricultural Research Corporation Sudan: Development of molecular markers for introgression of resistance to *Turcicum* leaf blight in sorghum
Cooperator: Agricultural Research Corporation, Wad Medani, Sudan
Key results: Additional knowledge was gained regarding the inheritance of resistance to Turcicum leaf blight in sorghum breeding materials relevant to central and eastern Africa. Mayada is due to start PhD study at Makerere University in 2011.
Email contact: mayadamamoun@yahoo.com

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Atwok Luka Awata (Sudan).
GOSS/Plant Breeder/Station Manager, Southern Sudan: Combining ability for multiple resistance to *Turcicum* leaf blight (*Exserohilum turcicum*) and maize streak virus disease.
Cooperator: NaCCRI
Key results: Information was obtained about the inheritance of resistance to these two diseases in maize germplasm in use in Uganda. Some crosses combined high yield with both resistances, and will be useful as new hybrids or as agronomically elite sources of resistance. Atwork is already back in Sudan heading a research station. Email contact: atwok11@yahoo.com

STUDENTS WHO HAVE COMPLETED THEIR M.SC. COURSES IN PLANT BREEDING AND SEED SYSTEMS, CROP SCIENCE, SOIL SCIENCE AND AGRICULTURAL EXTENSION UNDER AGRA AND SCARDA SUPPORT AT MAKERERE UNIVERSITY (2008-2010 COHORT)

Gafishi Martin Kanyamasoro (Rwanda). ISAR/Maize Breeding: Determination of the heterotic groups and mechanism of resistance of maize inbred lines to the maize weevil (*Sitophilus zeamais*)
Cooperator: NARO-Uganda
Key results: Breeding lines with good weevil resistance have been identified, and have produced hybrids with good yield, weevil resistance, and other desirable traits. Additional knowledge was gained about the inheritance of weevil resistance. Email contact: mkgafishi@yahoo.fr

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Inamahoro Micheline (Burundi). Plant Breeder: Characterization and genetic mapping of root development and resistance to *Radopholus similis* in a segregating diploid banana population (being revised). Cooperator: IITA-Namulonge
Key results: An effective system of characterizing root morphology and growth was developed, and revealed distinct differences among genotypes in root growth. A segregating banana population was characterized for nematode resistance, and several associations were found between molecular markers and nematode numbers and root growth. Micheline is back in Burundi and is one of the few scientists at ISABU.
Email contact: inamicheline@yahoo.com

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Nyongabo Fulgence (Burundi). Genetic studies of resistance to *Magnaporthe grisea* (rice blast) in upland rice.
Cooperator: NARO/NaCCRI
Key results: Inheritance of resistance to rice blast was characterized in Ugandan rice varieties that were challenged with isolates of different pathotypes. He is one of the 5 MSc scientists trained for Burundi under SCARDA.
Email contact: fulgeni@yahoo.fr

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MSc student -Agricultural extension under SCARD support 2008-2010 (1)

Leonidas Dusengemungu (Rwanda).
ISAR, Research-Extension Liaison:
Capacity for sustaining agricultural innovation platforms in Rwanda: A case study of *Research into Use* project.
Cooperator: ISAR

Key results: Deliberate strategies are needed for agricultural innovation platforms to transition from being donor supported to being self-sustaining. These strategies must clearly identify the motivations of the key actors in the platforms, and address their training needs.

Email contact: leodusenge2000@yahoo.fr

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MSc students (2) -Soil Science under SCARDA support - 2008-2010

Mathilde Uwizerwa (Rwanda). ISAR/Soil scientist: Optimization of Rhizobium and arbuscular mycorrhizal fungi synergetic benefits for grain legume production in Rwanda acidic soils.
Key results: Rhizobium isolates were identified that were superior to standard isolates on beans and soybeans in acid soils of Rwanda. These isolates have the potential to increase production of these crops in acid soils that are common in Rwanda and surrounding countries. Mathilde has returned to Rwanda and is working at ISAR Rubona station. Email contact: uwiz99@yahoo.com

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Cyamweshi Rusanganwa Katana (Rwanda).
ISAR/Soil scientist
Strategies for bush bean production improvement on a P fixing andosol with aquic moisture regime (conditions where soil is water logged).
Key results: The study has identified farmer copying mechanism for crop production under water logged condition that characterise many parts of Rwanda and South– Western Uganda. Additionally, management strategies for bean production have been suggested for volcanic soils.
He is due to resume work in the soil and water management unit of the ISAR and feels empowered to lead research in his country.
Email contact: crkatana@yahoo.fr

Developing Selection Criteria for Improving the Yield of Early Maturity Maize Genotypes in Zimbabwe

Early maturity maize escapes late season drought and provides food early in the season, consequently, it is widely grown in southern Africa. However, early maturity maize yields 30% less than late maturity ones, a huge trade-off between yield and benefits of planting early maize. The challenge is to increase yield of early maize while maintaining or reducing earliness. Breeding for high yield in early maize is complicated by absence of knowledge on genetic variability and inheritance of grain fill rate and duration thus limiting designing of breeding and selection strategies, and the speed of developing high yielding, early maturity maize. Studies by Mr. Edmore Gasura, a PhD student of Plant Breeding at Makerere University in Uganda has initiated field and laboratory studies at the University of Zimbabwe aimed at developing a selection criteria to improve yield of early maturity maize based on grain fill rate and duration.

Mr Gasura will evaluate genotypic variations in grain fill rate and duration of CIMMYT inbred lines through weekly destructive sampling of maize plants, followed by investigation of the nature of inheritance for grain fill rate and duration. Mr Gasura will also identify molecular markers for grain fill rate and duration. The expected outputs include three publications, a PhD thesis, high yielding and early maturity maize hybrids, and knowledge on the nature of inheritance and molecular markers for grain fill rate and duration.

Project Summary by Mr. Edmore Gasura

New Dean - School of Agriculture, University of Zambia

Dr. Mick Sikaenyi Mwala, a Zambian working for the University of Zambia as a Senior Lecturer in Plant Breeding. He has been appointed as the Dean to head the School of Agriculture at University of Zambia effective January 2011. He holds a BSc Agric Sci. (UNZA), an MSc in Agronomy (Plant Breeding) from South Dakota State University, USA and a PhD in Agronomy (Plant Breeding) from Missouri State University, USA. His research interests are in quantitative genetics studies on useful and neglected plants, breeding for improved productivity and utilisation in legumes and cereals and stress tolerance breeding. My contact details are: University of Zambia, P.O. Box 32379, Lusaka. Zambia. Tel: +260 977 670 635; Fax +260 250587/295655 and e-mail: mmwala@unza.zm; mmwala@yahoo.com, dean-agric@unza.zm

New Director– International Foundation for Science

The IFS Board of Trustees has appointed Dr Graham Haylor as Director of IFS, to succeed Dr Michael Ståhl who retired in September this year.

Dr Haylor, a British citizen and Aquaculture Specialist (with an honours degree from University of Liverpool in Marine Biology and an MSc and PhD from University of Stirling), has a long background in international development work, most recently as Senior International Development Specialist and Director of Business Development at Natural Resources International (NRIL) in the UK.

He has led and worked on many projects in Africa and Asia, particularly fisheries, aquaculture and communications programmes, in collaboration with governments, development agencies, donor organisations, researchers, farmers and fishers. As an academic, independent consultant and programme manager he has worked with universities, national, international and regional organisations and donors. Dr. Graham Haylor, has been a long term advocate for IFS and is a former scientific advisor. Following a recently concluded review he will lead an envisioning process which will frame future plans.