TECHNICAL CENTRE FOR AGRICULTURAL AND RURAL COOPERATION ACP-EU (CTA)

FORUM FOR AGRICULTURAL RESEARCH IN AFRICA (FARA)

ALLIANCE FOR A GREEN REVOLUTION IN AFRICA (AGRA)

REGIONAL UNIVERSITIES FORUM FOR CAPACITY BUILDING IN AGRICULTURE (RUFORUM)

AFRICAN NETWORK FOR AGRICULTURE, AGROFORESTRY AND NATURAL RESOURCES EDUCATION (ANAFE)

NEPAD PLANNING AND COORDINATING AGENCY (NPCA)

2009/2010 YOUNG PROFESSIONALS AND WOMEN IN SCIENCE COMPETITIONS

ABSTRACTS

Women

Ms Enangnon Espérance Bénédicte Eversun Zossou
Mrs Sounkoura Adetonah
Ms Nathalie Judith Kouakam Melele
Dr Theresia Luvuno Munga
Ms Eunice Wamuyu Githae
Mrs Lalini Unmole
Ms Petra Bola Abdulsalam-Saghir
Ms Adanma Amaefula
Ms Sarah Lubanga Mubiru

Young Professionals

Mr Delwendé Innocent Kiba
Ms Wendkouni Sabine Marie Flore Doamba
Mr Aimé Landry Dongmo Ngoutsop
Ms Sandrine Nguiakam
Mr Jean Augustin Rubabura Kituta
Mohamed Shebl Abd Elfattah
Mr Michael Kwabena Osei
Mr James Kyalo Mwololo
Mr Kevin Zowe Mganga
Ms Joan Auma Otengo
Ms Shelmith Wanja Munyiri
Mr Andrianjafy Rasoanindrainy
Mrs Aneeza Soobadar
Mr Joel Nwaeze Nwakaire
Ms Mariam Amale Tanjani Mapila
Mr Algaylani Abdalhafez Ahmed
Mr Lutengano Edward Mwinuka
Dr Robert Kajobe

Technological and Institutional Innovations Triggered by Farmer-to-Farmer Rice Parboiling Video in Central Benin

Espérance Zossou
AfricaRice / ULg, Gembloux Agro-Bio Tech
01 B.P. 2031, Cotonou, Benin
Phone : +229 95423721 / 90072867 Email: benezos@yahoo.fr / e.zossou@cgiar.org

Abstract
In Africa, rice production and processing tasks are allocated on gender basis, with women being responsible for much of the drudgery involved in processing. Parboiling rice is an important processing activity in the north and the centre of Benin. Good parboiling reduces the breakage rate during milling and greatly enhances the nutritional quality of rice. Parboiling is mainly done by women in and around rice production areas and is an important income generating activity. The traditional rice parboiling method is still dominant and does not yield quality rice. To address this, an improved rice parboiling technology was introduced in central Benin through two training methods: conventional training workshops and farmer-to-farmer video (initiated by AfricaRice). To compare these two methods in changing women rice processing practices, we interviewed 160 women and 17 women groups who had been exposed to both or one of the learning approaches in 16 villages. In addition, we interviewed 40 women processors in 4 control villages which had received no intervention at all. Video was well appreciated by both the NGOs and the target population as a good learning tool in rural areas and had reached three times more women (74%) than conventional training. While conventional training was biased by participant selection, stakes in per diem payment and monopoly by the elite class, video helped to overcome local power structures and reduced conflict at the community level. Women who watched video enhanced their creativity and adapt their learning to their environment by developing appropriate technologies. They improved their rice parboiling, leading to better quality rice. Apart from triggering local NGOs to improve their training methodology, farmer-to-farmer video also strengthened their relations with rural communities, and between the women rice processors and input and output markets.

Keywords: Rice video, training, changes, learning, entrepreneurship, social capital

Contribution of Rice and Vegetable Value Chains in the Inland Valleys in Southern Benin and in Mali: Farmers' Perceptions About Constraints and Opportunities Including Analaysis of the Financial Profitability of the Cultivation Systems

A. Sounkoura [1], C. Ousmane[1], S. Eric[1], D. Urbain[3], A. Soule[2], P. Sonia.[1], H. Joel.[4]

[1] International Institute of Tropical Agriculture, Cotonou, BENIN
[2] National Agricultural Research Institute, Benin, Agricultural Policy Analysis Programme Porto-Novo, BENIN
[3] Institute of Rural Economy, Sikasso, MALI
[4] Africa Rice Centre, Cotonou, BENIN

Abstract

The intensification and diversification of rice and vegetable cropping systems in the Inland valley contribute to food security and significant incomes. Major problems to the sustainable use of inland valleys are the degradation of natural resources and pollution related to population growth, insects and diseases, poor access to input and products market for the intensification. Intensifying inland valley systems will require the promotion of high value commodity chain system involving rice and vegetable with increased productivity and low per unit cost of production and natural resources. Africa Rice Center project fits well into this framework of promoting rice and vegetable value chains while protecting the natural resources. This study identifies the current production systems, assesses their constraints and analyzes the profitability of best bet rice and vegetable cropping systems. A sample of 235 producers was selected in Benin and Mali according to input use and access to product market. The findings show that four main chain stakeholders operate in the inland valley: producers, processors, traders and consumers. The study focuses on producers and the major constraints reported by farmers are attacks by insects and birds, the poor access to products markets and the unavailability of key inputs (seeds, pesticides, small equipment,) in both countries. Other constraints are high costs of transportation, post-harvest losses and poor conservation of fresh vegetables and tubers. The most profitable systems in the inland valley are the ones based on rice and vegetable (Gboma: Solanum sp) using improved seeds, follow-up of the system containing rice and "gboma" 'using improved varieties of rice such as NERICA associated with chemical fertilizers and herbicides. Rice associated with improved varieties of potato and mineral fertilizers is more profitable in Mali. Rice as sole crop is not profitable in both countries. Women are more involved in the sole cropping of rice in Mali.

Keywords: financial profitability, cropping systems. productivity, value chains, rice/vegetable, Benin, Mali

Fallow Legumes Entomofauna

N.J.M. Kouakam, M. Tindo, I.A. Parh and I. Nchoutnji

N.J.M. Kouakam, Institut de Recherche Agricole pour le Développement (IRAD), station de Dschang, B.P. 44 Dschang, Cameroon
M.Tindo, Université de Douala, Cameroon
I.A. Parh, Université de Dschang, Département de Protection des Végétaux, B.P. 222 Dschang, Cameroon
I. J. Nchoutnji, IRAD, station de Garoua, Cameroon

Abstract
Legume improved fallow is the alternative proposed by the International Institute of Tropical Agriculture (IITA) to shifting slash and burn cultivation. This study was conducted in line with the IITA alternative to evaluate the potentials of multi-purpose legume herbs and shrubs in a wet forest ecological zone. Since these legumes are hosts to insects, their entomological status was investigated. The legumes were *Cajanus cajan*, *Centrosema pubescens*, *Mucuna utilis, Pueraria phaseoloides* and *Tephrosia candida*. The study specifically aimed to conduct an insect collection, ascertain the relative abundance of insect orders, identify actual and potential pests, and evaluate the damage to these legumes. The following results were recorded. All five legumes were attacked by insects. Nine insect orders were collected. Pod borers were found in *C. cajan* pods. Many aphids found on *C. pubescens* were associated with ants. Alydids were actively piercing and sucking the sap of *M.utilis* leaves. Many orthoptera insects like Zonocerus variegates were chewing leaves of *P. Phaseoloides.* Pod borers and *Anoplocnemis spp* were found on *T. candida*. For the damage, tunnels were visible on the pods of *C. cajan.* 80 to 100% of *C. pubescens* leaves were shriveled. This may be due to a virus transmitted by aphids. Thripidae were found on flowering plants. Most of the insect species found on these legumes were pests of cultivated legumes such as soybean, common bean, and cowpea. This knowledge may be valuable for crop rotation in fallow management.

Keywords: insect, damage, leaf loss, collection, identification, order

Breeding for Cassava Brown Streak Disease Resistance in Coastal Kenya

T.L. Munga
KARI Mtwapa, Box 16 Mtwapa-80109, Kenya. Tel/Fax 254-0202024751

Abstract
Cassava (*Manihot esculenta* Crantz *ssp. esculenta*) productivity in coastal Kenya is low partly due to susceptibility of the popular varieties to cassava brown streak disease (CBSD). Host resistance is the most economical method to control CBSD. However, breeding acceptable high yielding and CBSD resistant varieties is hampered by limited information on farmers' preferences in cassava varieties and lack of an effective cassava brown streak virus (CBSV) inoculation technique. Information on the inheritance of CBSD resistance, root yield (RY), dry matter % (DM%) and cyanide (RC) is also lacking. Results of a survey conducted in three districts of coastal Kenya indicated that early maturity followed by high dry matter content and yield were the most important characteristics preferred by farmers. Evaluation of five CBSV inoculation techniques showed that plants inoculated with *CBSV* by grafting infected scions had significant highest percentage of plants with CBSD leaf symptoms and least number of days to first appearance of the symptoms. An analysis of the F_1 progeny of 9 x 9 diallel crosses showed highly significant general (GCA) and specific (SCA) combining ability effects for the incidence of CBSD (ICBSD) and RY at the seedling stage. Both GCA and SCA effects were significant for all the traits evaluated at the clonal stage but additive effects were more important than the non-additive effects except for DM%. Kaleso followed by Gushe had the most significant and negative GCA effects for CBSD resistance. Kibiriti-mweusi had the most positive and significant GCA effect for RY. Thirty CBSD resistant hybrids yielding over 40 t ha^{-1} were identified. Thirty six scientists from 8 countries were trained on wedge grafting infected scions on cassava plants.

Keywords: combining ability, inoculation, grafting

Genetic diversity of gum arabic-producing *Acacia senegal* varieties in Kenya using Inter-Simple Sequence Repeats (ISSR) and chloroplast Simple Sequence Repeat (cpSSR) markers

Eunice W. Githae
Department of Land Resource Management and Agricultural Technology, Faculty of Agriculture, University of Nairobi, P. O. Box 29053-00625, Nairobi, Kenya.
Tel: +254 725 286 095, Email address: egithaeh@gmail.com

Abstract

Acacia senegal is a drought-tolerant multipurpose tree species highly valued for gum arabic production and increasingly being used in agroforestry in sub-Saharan Africa. Despite long history of utilization, there has not been exhaustive genetic evaluation of the extant genetic resource base of *A. senegal* in Kenya for genetic improvement of the species. Inter-Simple Sequence Repeats (ISSR) and chloroplast microsatellites (cpSSR) markers were used to study genetic diversity among seven Kenyan populations of *A. senegal* embracing three putative varieties namely; *kerensis*, *leiorhachis* and *senegal*. The two marker types detected similar levels of Nei's gene diversity (H_{ISSR}= 0.211, H_{cpSSR}= 0.212) among the *A. senegal* populations. *A. senegal* variety *kerensis* exhibited the highest diversity using ISSR marker (H_{ISSR}= 0.248), followed by variety *leiorhachis* (H_{ISSR}=0.218) and s*enegal* (H_{ISSR}= 0.151). Analysis of Molecular Variance (AMOVA) detected significant genetic variations within and among populations (*P <0.001* and *P<0.01*, ISSR and cpSSR, respectively). Based on the UPGMA dendrogram of the seven populations, two regions were differentiated (North and South). Both markers demonstrated their potential for delineating population structure at local and regional level, and infra-specific relations within the species, hence their potential as tools for conservation, improvement programmes and sustainable utilization of the species. This study provides baseline genetic information for the domestication of *A. senegal* varieties in Kenya.

Key words: conservation, gene flow, variation, molecular markers, leiorhachis, kerensis

A Sustainable Approach for the Management of the Legume Pod Borer, *Maruca vitrata* Fabricius on Bean in Mauritius

L. Unmole
Entomology Division, Agricultural Research and Extension Unit, Réduit, Mauritius

Abstract
The French bean, *Phaseolus vulgaris* L., is a strategic crop grown on about 360 hectares in Mauritius. *Maruca vitrata* F., *Etiella zinckenella* Tr. and *Lampides boeticus* L. are reported as major pod borers damaging floral parts and pods of bean without any investigation on their economic importance. Previously, insecticides were only screened at field level to update control recommendations. However, chemical control had not always been effective and farmers resorted to indiscriminate use of insecticides. Such practice has eventually raised health, economic and environment concerns. This 4-year study has addressed the pod borer complex in bean cultivation for the development of a sustainable pod borer management strategy. *Maruca vitrata* was found to be the only pod borer of economic importance causing up to 42% pod damage in untreated bean plots. Three existing plant species (*Phaseolus lunatus* L., *Pueraria phaseoloides* (Roxb.) Benth. and *Macroptilium atropurpureum* (DC.) Urb.) were recorded to host *M. vitrata* for the first time in Mauritius. Mung bean sprouts is a new and cheap larval diet for rearing of *M. vitrata* in laboratory. Three types of natural enemies (egg parasitoid, entomopathogenic fungus and nematode) were detected on *M. vitrata* for the first time in Mauritius. Laboratory tests showed that the egg parasitoid, *Trichogramma chilonis* Ishii, has attributes of an effective bio-control agent of *M. vitrata*. Biopesticides and IPM compatible products (*Bacillus thuringiensis*, azadirachtin, chlorantraniliprole, indoxacarb and spinosad) were identified as suitable alternatives to broad spectrum insecticides. Tested pheromone lures were not effective in luring males of *M. vitrata* and this indicates that the Mauritian *M. vitrata* could be a geographically distinct population.

Keywords: *Trichogramma chilonis*, *Bacillus thuringiensis*, chlorantraniliprole, indoxacarb, spinosad, azadirachtin

Cassava: Adding Value for Africa: Gender and Diversity as a Driving Force

Petra Abdulsalam-Saghir.
Natural Resources Institute, University of Greenwich, Chatham, ME4 4TB Kent, United Kingdom E-mail: petrajib@yahoo.com & ap921@greenwich.ac.uk

Abstract
Cassava: Adding Value for Africa (C:AVA) Project explore the strategic and practical gender needs of major actors in the cassava value chain in Nigeria, analyse gender roles, explore access and control of resources, and influencing social relations factors along the value chain. The data were analyzed qualitatively using brainstorming sessions and discussion among multidisciplinary group. Presently, women participation in the project has increased from less than 10% at the beginning to more than 85% at all level of value chain. The ability of men and women to access resources in the cassava value chain differs in many locations. Opportunities and financial benefits from cassava production and processing, are contributing to changes in gender roles and responsibilities with financial increase of over £50/month for both men and women through C: AVA capacity enhancement. The study concluded that for successful projects intervention and transformation of smallholder farmers and those of their households, there is need to have gender inclusive interventions because gender based constraints affect the structure and relationships of value chains. The project is therefore helping vulnerable groups to prioritize in terms of opportunities, for older women in polygamous marriages as well as women headed households, widows, youth and men in project activities.

Keywords: gender mainstreaming, cassava farmer, village processors, vulnerable groups

Economic Evaluation of Sweetpotato Varieties under Different Intercropping Systems in Nigeria

A. Amaefula and G.N. Asumugha
National Root Crops Research Institute, Umudike, P.M.B.7006, Umuahia Abia State, Nigeria.

Abstract
Sweetpotato plays important role in the diet of many Africans. It is nutritionally rich in calcium, iron, vitamins and minerals. Sweetpotato is tolerant to adverse weather and soil conditions and yield highly in short growing season. High incidence of pests and diseases, inappropriate agronomic practices, degeneration of older varieties, low output prices among other factors limit sweetpotato production in Nigeria. Intercropping ensures a better utilization of resources, reduction in pest and disease load and insurance against crop failure. It is therefore paramount to evaluate the different sweetpotato intercrops before making recommendation to farmers. The objectives of this study were to compare cost, revenue, yield and profitability of the various sweetpotato production enterprises and to compare the profitability of sole mixed cropping systems. The profitability of the different enterprises was determined using Benefit/Cost Ratio. Maize and sweetpotato enterprise was the only profitable cropping system. Maize and sweetpotato intercrop had BCR of 1.17, which implies a profit of ₦17 for every ₦100 invested.Maize and TIS87/0087 was the most profitable sweetpotato intercrop with Benefit/Cost Ratio of 1.28 which implies a profit of ₦28 for every ₦100 invested.

Keywords: profitability, yield, revenue, cost of production and benefit/cost ratio

Development of 'ENDIISA" Decision Support Tool for Improved Feeding of Dairy Cattle in Uganda

Project Team Leader
i.i. Dr. Sarah L. Mubiru (*Contact during the period when the research was done)*
Team Leader - Animal Nutrition, National Livestock Resources Research Institute (NaLIRRI), P.O. 96, Tororo, Uganda, Email: sarah2mubiru@yahoo.com/smubiru@naro-ug.org , Tel: +256 772 418678
i.ii. Dr. Sarah L. Mubiru *(Current contact information)*
Programme Assistant, Livestock and Fisheries Programme, Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), P.O. Box 765, Entebbe, Uganda. Email: s.mubiru@asareca.org/sarah2mubiru@yahoo.com , Tel: +256 772 418678

Abstract
Efforts for improvement of livestock feeding in Uganda have achieved great strides in identification of nutritious feed resources for cattle (Kabirizi, 2006; Nakiganda 2004; Mwebaze, http://www.fao.org/ag/AGP/AGPC/doc/Counprof/uganda.htm; Stobbs, 1969). The feed resources include pasture grasses and legumes, leguminous shrubs or multi-purpose trees, crop residues and agro-industrial by-products. Despite, knowledge and in some instances utilisation of the appropriate feed resources, milk production on dairy farms has remained low in the ranges of 2–5 $Lcow^{-1}day^{-1}$ (Mubiru, 2006; Mubiru *et al*., 2007). This poor performance is clear indication of a gap in the knowledge disseminated to farmers with regards to cattle feeding. One major knowledge gap that was identified in studies done in Uganda was the inability by farmers to know the quantities of feeds that would adequately meet the nutritional requirements of their animals. As a result, the farmers only provided 59% and 36% of the required metabolisable energy (ME) and crude protein (CP) respectively to their animals (Mubiru *et al*., 2003). As such, it was found necessary that a mechanism be developed by which farmers could establish adequate feed quantities for their cattle even when they are combining a variety of feeds. One practical means of achieving this was through the use of a decision support tool which was one of the major outputs of this research. In conclusion, the study provided information on the low status of feeding of dairy cattle in the central zone. The DST that was developed and tested with improved cattle feeding status increasing milk production by 24%. The tool, which was uploaded on the website of the National Agricultural Research Organisation (NARO-Uganda) should be recommended for use by farmers, researchers, trainers and policy makers. A mechanism should be established for regular updating of the DST to include new feed resources and incorporation emerging information.

Keywords: metabolisable energy (ME), crude protein (CP), milk production, feed combinations, nutritional requirement

Human urine effect on eggplant (Solanum melongena) production and salt accumulation in soil

Delwendé Innocent KIBA, Moussa BONZI, Francois LOMPO, Noufou OUANDAOGO, Papaoba Michel SEDEGO.

Laboratoire Sol-Eau-Plante, Institut de l'Environnement et de Recherches Agricoles (INERA), BP 476 Ouagadougou 01.

Corresponding author: Delwendé Innocent KIBA,
Institut de l'Environnement et de Recherches Agricoles (INERA), BP 476 Ouagadougou 01 Burkina Faso. E-mail: innokiba@yahoo.fr

Abstract

ECOSAN concept considering human urine as source of nutrients for crops could be a good approach to supply low cost fertilizers to African smallholders. However human urine could have depressed effect on plants growth mostly salts sensitive crops as eggplant. Pot experiment carried out with 3 doses of human urine in comparison with mineral urea showed that the dose Q/2 (540 ml of human urine per plant) supplying N two times lower than the dose Q of mineral urea improved eggplant growth and flowering as mineral urea contrarily to doses Q (1.08 L of urine per plant) and Q+Q/2 (1.62 L of urine per plant) which led to depressed effect on eggplant. In incubation experiment human urine and mineral urea supplied separately to the soil at the same N dose as the doses Q of human urine and urea in the pot experiment (0.42 N per Kg of soil) led within 12 days of incubation to soil pH increase and to nitrification two times lower than mineral urea. The two times dilution of the dose Q of human urine with water decreased soil pH and increased the nitrification rate 12 times more than the pure urine. We concluded that the dose of 540 ml of urine per eggplant is the optimum dose for good production and suggested that the dilution of human urine would be a suitable way to minimize potential accumulation of salt in the soil and to improve nitrification process. Dilution techniques of human urine were proposed to farmers.

Keywords: ECOSAN, low cost fertilizer, optimum dose, soil pH, African smallholders

Variation of biological activity on plots with stony cordons in the Kouritenga Province in Burkina Faso

Sabine Marie Flore Doamba and Hassan Bismarck Nacro
Rural Development Institute
Université Polytechnique de Bobo-Dioulasso
01 BP 1091 Bobo- Dioulasso, Burkina Faso
Tel: (226)701335
Fax: (226)20982577
Email: doambaflore@yahoo.fr

Abstract
Burkina Faso is a country located in the Sudano-Sahelian zone of West Africa. For many decades, it has been facing some serious problems of degradation of its natural resources. The development of agrosylvopastoral productions is limited to degraded lands. To solve these problems and to improve their living conditions in this difficult environment, measures for the restoration and conservation of their space with stony cordons, have been taken by the local population This study consisted, first of all, in monitoring biological activity through an inventory of soil macro fauna and secondly of the characterization of soil physico-chemical parameters. This had been done with two kinds of plots (a plot with stony cordons and a control plot). The study revealed an increase in the size and the diversity of the macro fauna in the plot with stony cordons while the values were low in the control plot. There is also an increase of the proportion of fine particles and improved levels of total carbon in the plot with stony cordons. These results attest to the ecological impact of stony cordons in improving soil fertility in the Sahel.

Keywords: soil degradation, stony cordons, macrofauna, Kouritenga

Territories, flock and biomass: management challenges for sustainable use of resources in Northern Cameroon

Aimé Landry DONGMO
Institut de Recherche Agricole pour le Développement, BP 415, Garoua, Cameroon.

Abstract
Over the past 30 years, the southern part of the Sudano-Sahelian Africa, hosted a large population of farmers and Fulani herders in search of arable land and pastures. The farmers have respectively developed agricultural practices that maintain soil fertility through long fallow periods. The pastoralists have developed practices in order to exploit both natural forage and crop residues distributed along the space during the year. In this context where the population tends to double every 20 years while the agricultural production is still based on the extensive system, the high human pressure on resources has today disturbed the balance. The natural grazing land is cultivated by farmers in order to extend crop production; while the historical free grazing right of pastoralist herds on farmers' crop residues is now challenged. Competition, tensions and conflicts have become common for the utilization of crop residues as forage, or as organic manure or for mulch-based cropping system. Participatory analysis of practices (approach of local knowledge and follow-up of cropping and livestock systems), experiments and discussions with stakeholders have been carried out in 3 territories of northern Cameroon (NC). The indicators of practices have helped to design innovative models of management of plant biomass and of land. The first model explains the present and innovative process of production and of utilization of biomass for different types of agricultural farms. The second one focuses on the way the needs of stakeholders can be taken into account to build the "win-win" mechanisms of management and of sharing the biomass between farmers and herders on the territory.

Prices of Raw Materials, Budgetary Earnings and Economic Growth: A case Study of Côte d'Ivoire

NGUIAKAM Sandrine and KABORE Augustin
ENSEA
nguiakam_sandrine@yahoo.fr; ngsandy12@yahoo.com; aug_kabor007@yahoo.fr
Tel : (+237) 99 94 31 23

Abstract

The objective of this study is to evaluate the impact of the fluctuation of international prices of raw materials on the variability of the GDP in the Ivory Coast. The study uses the Vector Autoregressive model on international data set on primary products and export earnings, inflation and GDP were selected variables analyzed to conform to this instability. The results show that from 1960 to 2005, fluctuations of coffee prices explain about 15 % of the variability of the total output. On the other hand, the exports earnings explain approximately 25 % of this variability. The exchange rates of the dollar and fluctuation of petroleum price, which are external factors, also had a not insignificant impact on the dynamics of growth of Ivory Coast. These results confirm the dependence of the Ivory Coast economy on raw materials. They illustrate the need for the continuation of efforts aimed at diversifying the economy, in particular, of the agricultural sector, and encouraging the setting-up of an observatory for a better interpretation of the world economic environment, in order to envisage and absorb the various shocks.

Key words:
Impact, coffee, cacoa,oil, exports, shock, GDP.

Evaluation of the Impact of the Mosaic on Varieties of Sweet Potato, *Elenyi, Mugande, Karebe II, Japan, Tainung* in the Rural Area of South-Kivu on the West Coast of Lake Kivu

J A.K., Rubabura, M.A., Bisusa.
Department of Biology, Centre for Natural Science Research, CRSN / Lwiro, South Kivu, Democratic Republic of Congo.

Abstract

This study concerns the agro-piscicultural project CEMUBAC. Its aim is to value the real impact of the mosaic on five varieties of sweet potato in the rural area on the west coastline of Lake Kivu in South Kivu, D.R.Congo. ANOVA 1 and the method of direct observation were used. The variety has shown *Elengi* performance by giving a high yield, large tubers, weight despite good viral infection than other varieties, this virus comes from non-healthy planting material. This explains an assessment by the rural population of South Kivu on the western shore of Lake Kivu, which is why it is the most cultivated. As a recommendation, the mosaic is a bad disease on sweet potato and is often infected with one or other of these viruses or SPFMV SPMMV. Control of virus diseases of sweet potato depends primarily on the use of clean planting material, certified if possible. Therefore, we ask the peasant farmers that their fields should be regularly inspected and any suspicious looking plant must be taken off immediately it is detected.

Manufacture of leafcutting bee hives for better crop and yield production in Africa "Egyptian Model for Alfalfa Pollination"

Mohamed Shebl Abd Elfattah
Entomological Laboratory, Graduate school of Bioresource and Bioenvironmental, Kyushu University, Fukuoka, 812-8581, Japan.
Dept. of Plant Protection, Faculty of Agriculture, Suez Canal University, Ismailia 41522, EGYPT.
e-mail: mohamedshebl2002@hotmail.com
Tel: +81-092-642-3048, Fax: +81-092-2839

Abstract
The pollination of flowering plants is an important ecological service in natural and agricultural ecosystems. The majority of angiosperm plants rely on animals for pollination. The coevoulution of bees and flowers has resulted in special morphological adaptations for both insects and plants, and the need of some plants for pollination by bees are absolute. One of the major forage corps in Egypt and other part of the world is alfalfa. The leafcutting bees are very important pollinator of alfalfa, different natural nests had been found in Eastern part of Egypt but these nests under a high risk due to construction of news house instead of old mud wall houses. Foam nests had been created yearly from 2003 and used as hives for conservation of bees and used it for alfalfa pollination. The impact of using leafcutting hives proved a high seed production and easy to handle by farmers, the hives are very easy for preservation, storage and reuse.

Key words: Alfalfa, Pollination, Seed Production, Leafcutting bees.

Morphological Characterization of African eggplants (*Solanum species)* Germplasm in some African countries

M.K. Osei
CSIR-Crops Research Institute
Horticulture division
P.O.Box 3785,
Kumasi, Ghana

oranigh@hotmail.com

M.O.Oluoch
AVRDC-The World
Vegetable Center
P.O.BOX 10, Duluti,
Arusha-Tanzania

m.oluoch@cgiar.org

C.K.Osei, B. Banful,
KNUST, Agric
Faculty
/CDL, Univ. Post
Office
Kumasi, Ghana
ckosei@yahoo.com,
bproofa@gmail.com

Abstract
The high nutritive value of African eggplant leaves and the high leaf and fruit yield, as well as the fairly high resistance to pests and diseases make the crop interesting for development. Long period of selection by Peasant farmers has however resulted in a number of landraces. Nevertheless, the selected landraces are well scattered across the major agro-ecologies of Africa making it difficult to concentrate on the desirable traits required for genetic improvement of the crop. Systematic characterization of available crop varieties using morphological traits is needed to fuel breeders' efforts in these species. Consequently, the idea of this work was to characterize African eggplant germplasm collected from Ghana, Uganda, Cameroun, Ivory Coast, Sudan and Tanzania. Twenty-eight accessions of African eggplant made of *Solanum aethiopicum* (16), *Solanum macrocarpon* (9) and *Solanum anguivi* (3) were characterized using their morphological characteristics. The results indicated distinct and wide variations between the three *Solanum species* studied. Distinct variation was noticeable in fruit characteristics, both between and within species. Lines belonging to the *S. anguivi* had small sized round fruits, while *S. aethiopicum* had medium to large sized oval fruits. There were however a lot of similarities between the *S. aethiopicum* and *S. anguivi* lines. This suggests the two materials being closer to each other than they are to the *S. macrocarpon*.

Keywords: landraces, traits, variation, breeders, vegetative, selection, characters

Integration of Farmers in Technology Development as a Basis for Enhancing Sweetpotato Productivity in Kenya

J. K. Mwololo [1,2] , P. W. Muturi[1,2], M. W. K. Mburu [2], R. W. Njeru [2], N. Kiarie [2], J. K. Munyua [2], E. M. Ateka [3], R. W. Muinga [4], R. E. Kapinga [5] and B. Lemaga [6].
[1]Faculty of Agriculture, Makerere University, P.O.Box 7062 Kampala
[2] College of Agric and Veterinary sciences, University of Nairobi, P. O. Box 29053, Nairobi;
3 Department of Horticulture, Jomo Kenyatta University , P.O Box 62000, Nairobi;
[4]Kenya Agricultural Research Institute; P. O. Box 16, Mtwapa;
[5]International Potato Centre, P. O. Box 22274, Kampala, Uganda;
[6]Regional Network for Improvement of Potato and SweetPotato in Eastern and Central Africa (PRAPACE), P. O. Box 22274, Kampala, Uganda

Abstract

Sweetpotato is a food security crop for smallholder farmers in East Africa. Pest and disease constraints are the most important biotic stresses, with viral diseases being the most devastating. Through a focused group discussion, it was established that lack of clean sweetpotato planting vines is a major constraint in sweetpotato production. Consequently most farmers establish a new crop from virus infected volunteer plants or an old sweetpotato crop. The objectives of the study were to identify farmer friendly technologies for conservation and maintenance of healthy planting vines; dissemination of the best appropriate technology to farmers and varieties tolerant to the sweetpotato virus disease and to expose farmers to sound sweetpotato production and value addition practices for increased income generation. The experiments to evaluate the best technology for multiplication and maintenance of clean planting vines were carried out at the University of Nairobi, Kabete farm and Jomo Kenyatta University, Juja farm. A moderately susceptible sweetpotato variety (SPK004) was used in the experiment and a randomized complete block design was adapted. Different treatments were applied; spraying with dimethoate, physical barrier to virus vectors (insect proof net and polythene), maize plants as a physical barrier surrounding plots, roguing and the control. Parameters monitored were sweetpotato virus disease (SPVD) incidence, whitefly and aphid population. No disease symptoms were observed except on the control and rouging treatment. Aphid vectors were not observed in both sites. Through a participatory approach the rouging, net and polythene cover technologies were demonstrated to farmers in coastal Kenya for evaluation of seventeen sweetpotato genotypes for resistance and or tolerance to the sweetpotato virus disease. By end of the project, more than one hundred farmers had adopted the technology of rouging. Disease tolerant varieties were also disseminated to the farmers after the end of the evaluation period of the seventeen sweetpotato genotypes with the farmers in fields of two key groups in the region. The on farm evaluation trials formed a basis for training farmers who were members of the groups on sweetpotato production agronomic practices and disease diagnosis procedures. Some farmers from the two key groups had an opportunity to attend a farmers' exchange visit in Uganda under the courtesy of the Regional Universities Forum for Capacity Building in Agriculture. As a concluding remark, integration of farmers in research coupled with capacity building can enhance adoption of new technologies thereby enhancing sustainability.

Key Words: Sweetpotato virus disease, biotic stress, focused group discussion, food security, technologies, participatory, dissemination

Reseeding – A Gateway to Rehabilitation Success, Food Security and Sustainable Livelihoods in Drylands Africa

K.Z. Mganga[1*] N.K.R. Musimba,[1] M.M. Nyangito,[1] D.M. Nyariki[1] A.W. Mwangombe[2], W.N. Ekaya, [3] W.M. Muiru, [2] D. Clavel, [4] J. Francis, [5] R. von Kaufmann[6] and J. Verhagen[7]

[1] Department of Land Resource Management and Agricultural Technology
University of Nairobi, P.O.BOX 29053-00625 Nairobi, Kenya
[2]Department of Plant Science and Crop Protection, University of Nairobi
[3]RUFORUM, Uganda
[4]CIRAD, France
[5]CTA, Netherlands
[6]FARA
[7]Wagengen University, Netherlands

Abstract
Land degradation is a major problem in the semi-arid environments of sub-Saharan Africa. Fighting land degradation is essential to ensure the sustainable and long-term productivity of the inhabited semi-arid lands. *Cenchrus ciliaris* (African foxtail grass), *Enteropogon macrostachyus* (Bush Rye) and *Eragrostis superba* (Maasai love grass) are important perennial grasses in the East African semi-arid lands. A study was conducted to establish the contribution of these indigenous grasses in improving soil hydrological properties, rehabilitation, food security and improving the livelihoods of agropastoral communities in semi-arid districts of Kenya. Soil hydrological properties were tested using a Kamphorst simulator at different stubble heights which represented three different grazing intensities (low, medium, high). Percent ground cover was estimated using the step-point method. A survey was also conducted across 50 agropastoral households to establish the multidimensional benefits of the grasses. Results showed that sediment production as a function of runoff and infiltration capacity were significantly different ($p<0.05$) at different stubble heights representing the different grazing intensities. Percent ground cover estimates of the grasses were also significantly different ($p<0.05$). *Cenchrus ciliaris* had the greatest influence in improving soil hydrological properties. *Enteropogon macrostachyus* and *Eragrostis superba* were ranked second and third respectively. *Enteropogon macrostachyus* had the highest percent ground cover. *Cenchrus ciliaris* and *Eragrostis* were ranked second and third respectively. These were attributed to the growth and morphological characteristics of the grasses. Generally, an increase in stubble height increased infiltration capacity and reduced runoff and sediment production. Results from the household survey showed that the grasses provide a source of income through the sale of hay, grass seeds and milk which is also a source of a balanced diet. The grasses also provide a cheap source of thatching materials and livestock feed.

Key words: ground cover, perennial grasses, semi-arid, soil hydrological properties

Impacts of Proposed Large Scale Monoculture Developing Projects on Wetlands and Wetlands Dependent Communities

Joan Auma OTENGO (Kenya Wetlands Forum Secretariat c/o East African Wild Life Society).

Abstract
The Tana Delta wetland is located in the new district called Tana Delta which was hived from the larger Tana Delta River District. Tana delta is estimated to cover about 130,000ha of which 69,000ha are regularly inundated. Several projects are proposed for this area; industrial shrimp aquaculture, The Collapsed Tana River Rice Irrigation Scheme, Jatropha farming, The Tinum mining, Oil and Gas exploration and 40,000hectares are earmarked for horticulture farming by Qatar Government. A clear Tana Delta wetlands strategy that recognizes the inherent rights, dependence and role of community in the overall well of the ecosystem is needed.

Keywords: Wetland, rights of indigenous people, community involvement

Effects of Moisture Stress at Flowering on Phenotypic Characters of Selected Maize Local Landraces in Kenya

S. W. Munyiri[♣1] R. S. Pathak[1], and I. M. Tabu[1]

.

[1]*Egerton University, P.O. Box 536, Njoro, Kenya.*

[♣]*Corresponding author's e-mail:* wanja_munyiri@yahoo.co.uk

Abstract

Arid and semi arid areas constitute about 82% of the total land area and supports about 20% of the country's human population. Local maize landraces are an important livelihood resource in these areas. The objective of the study was to characterize selected Kenyan local maize landraces for drought tolerance. Secondary traits exhibiting high heritability for drought tolerance such as grain yield, anthesis-silking interval (ASI), tassel size, ears per plant and leaf rolling were evaluated. In season I, the 25 genotype were grown under optimum conditions under normal rainfall supplemented with irrigation for the determination of the anthesis-silking interval (ASI), ears/plant, tassel size and grain yield. In season II, based on the ASI the genotypes were planted in Alpha lattice design in two separate experiments; optimum and water stressed conditions each replicated 3 times. In the drought stressed plots, irrigation was withheld one week to tassel anthesis and resumed after male flowering had been achieved in the water stressed plots. Among the characters evaluated, a low ASI (1-6 days) was associated with a high level of drought tolerance and low yield losses. Drought stress resulted in 17% to 81% relative grain yield loss. Landraces GBK-032419 and GBK-034659 exhibited lowest grain yield losses of 28% and 17% while two dry-land Composites used as controls exhibited higher grain yield losses of 62 and 68%. In general, an increase in the number of ears per plant, reduced leaf rolling and low ASI were associated with yield increases under moisture stress. Local landraces that exhibit drought tolerance characteristics were identified. These could be recommended for production in marginal areas of Kenya inhabited by resource-poor farmers. Research approaches aimed at stabilizing yields in these landraces could play a key role in mitigating hunger as they are already adapted to the widely varying environments in Kenya. Further, the drought tolerant traits identified could be introgressed into recommended Composites for the marginal areas.

Key words: Anthesis-silking interval, drought, leaf rolling, tassel size, silking, grain yield

Using ICT to Improve Farming Activities

Andrianjafy Rasoanindrainy
Farming and Technology for Africa (FTA) – PK 16 - RN3
Antananarivo
Madagascar

Abstract
Farming is the main occupation and source of income for rural population in developing countries like Madagascar. Therefore, improving farming activities is a key component in the fight against hunger and poverty. This research focuses on the possible impact of using ICT in farming activities. More of a computer scientist, the author wanted to find out if and how ICT could improve farming activities, which areas can be improved and whom can be involved in the development of farming materials using ICT. Three specific experiences are presented here: (1) an attempt to develop and use a farming software developed in the context of the Farming and Technology for Africa (FTA) initiative, (2) production and dissemination of multimedia material especially video and animated presentations for agriculture technical training, and (iii) websites and portals to disseminate information and materials. The research shows that some farmers, development agents and extension people, but particularly, young people in rural areas can largely benefit from the use of these ICT tools. Many operations involved in farming activities are improved: training, tracking and recording data, reporting, evaluating, sharing and exchanging information. The ICT tools help young farmers to be more informed, to have better understanding, to decide and take action in a better way while farming. The use of ICT in agriculture brings along new qualities such as accuracy, reliability, effectiveness, efficiency, clarity and structured approach. However, some limitations exist. Full use of tools presented requires computer, electricity and low-cost internet connectivity in rural area. The use of some tools such as the farming software requires some skills and an important change in culture. Nevertheless, at FTA, we are convinced that young farmers and people with vision will find and bring more innovations and find other new ways to use ICT to change the trends in rural areas.

Keywords: computerization, dissemination, information, agriculture, multimedia, website

Looking at wastes as valuable resources – an example from the sugarcane industry in Mauritius

A Soobadar
Mauritius Sugar Industry Research Institute, Mauritius

Abstract

The combustion of coal and bagasse for cogeneration of electricity by the sugarcane industry in Mauritius generates annually some 40 000 T of ash as wastes that need to be disposed of in an environmentally sound manner. From the same perspective, the production of 30 million L ethanol will generate 400 000 T of vinasse, while with the rising standard of living some 35 000 T sewage sludge will be produced to become a burden to the community at large. It is the sincere conviction of the author that all these wastes can serve a useful purpose and can be turned into a resource. Indeed Mauritius imports annually 9000 T nitrogen (N), 3000 T phosphorus (P) and 9000 T potassium (K) to fertilize its sugarcane fields and there should be no reason why a reuse of these wastes cannot be a substitute for the mineral NPK. Applying wastes to crops however requires careful consideration on account of undesirable organic contaminants and heavy metals which may pose a hazard to natural ecosystem and human health.

A study initiated in Mauritius showed that coal ash, vinasse and sewage sludge did not affect soil pH, soil salinity and if soil exchangeable bases, even when applied at 100 T/ha. With vinasse, sewage sludge and ash when used judiciously, no significant difference in the cane or sugar yield would be encountered when compared to mineral fertilizers. Leaching of heavy metals and organic micro pollutants down the soil profile to reach the ground water sources are very unlikely and should not be an impediment to the disposal of sewage sludge, vinasse or ash in sugar cane fields. As adequate fertilization is the key to crop production, the present study provides a fresh outlook at how crop nutritional requirements can be met to provide enough food to feed the poor, particularly in rural areas.

Keywords: vinasse, ash, sewage sludge, nutrients, fertilization

Design, Construction, and Testing of a Low Cost Maize Thresher

[1]J. N. NWAKAIRE, and [2]M. Mkpado
[1]Department of Agric. & Bioresources Engineering University of Nigeria Nsukka &
[2]Department of Agriculture, Ngor-Okpoala L.G.A, Imo State, Nigeria
E-mail: [1]joelnkem@yahoo.com,joel.nwakaire@unn.edu.ng, [2]manotejah341@yahoo.com
Tel.: +2347035020691, +2348035813278

Abstract
The processing of agricultural product into quality forms not only prolongs the useful life of these products but also increases the net profit farmers make from such products. In this work, emphasis was place on demand led design which involved understanding the need of the farmer and designing an appropriate system that meets that need. The objectives of the work were to design, construct, and evaluate a low cost maize sheller for rural farmers in Nigeria. The methods used involved the collection of farmers opinion on their sheller needs, selecting appropriate materials, and utilization of theories of failure that enable the determination of allowable shear stress on the bearing supports. The communication methods used were an interactive sessions with farmers especially the women and children, in other to determine their shelling problems. Comparison was made between the human performance index for shelling and the machine performance index. The human mechanical efficiency, through-put capacity and grain handing capacity are 45%, 26.67kg/hr and 21.1kg/hr at a biomaterial test weight of 20kg with actual shelled weight of 15.8kg at a shelling time 45 minutes. The efficiency, through-put capacity and the grain handing capacity of the sheller are 86%, 119.76kg/hr and 109.99kg/hr respectively. The price difference shows a drastic reduction in the purchase price of maize thresher by ₦ 32,500.00 or $216.67, which represent 56.52% price reduction. Market days were also used as an opportunity to show the farmers and agro-processors the advantage of using the maize sheller.

Keywords: construction, low-cost, maize thresher, efficiency, rural farmers

Assessment of the macro-micro linkages between rural livelihoods, agricultural research innovation systems and agricultural policy changes in Malawi

Mariam A.T.J. Mapila
Department of Agricultural Economics, Extension and Rural Development
University of Pretoria

Abstract
This paper presents on a study conducted in Malawi to assess the impact on rural livelihoods of the use of agricultural research innovation system concepts in implementing agricultural research initiatives and the potential impact on future household incomes of linking these households to the macro-economy given fertilizer policy distortions. Using propensity score matching to establish a counterfactual and single differencing to measure impact show that livelihood outcomes are significantly impacted upon by agricultural innovation system interventions in that participating households have more robust livelihoods and higher production outcomes. However phasing out of the research program led to erosion of the positive livelihood outcomes. The study further finds that fertilizer subsidy policy distortions have the potential to lead to small but significant negative changes in future rural household incomes. Recommendations are that the establishment of a national innovation forum would go far as a communication tool to ensure greater capacity building of local extension agents and increased budgetary support to ensure understanding and application of agricultural innovation systems concepts in public agricultural extension programs. In addition, it would also ensure the mainstreaming of innovation system concepts in all public agricultural research and extension policy documents and work towards demystifying the concepts of innovation systems to rural communities whose participation in crucial.

Keywords: Propensity score matching, simulation analysis, partial equilibrium modeling, Impact assessment, Enabling Rural Innovation, Fertilizer subsidies

Resources Use Optimization in Main Food and Cash Crops Production a Way-out to Food Security and Poverty Alleviation in Sudan

Elgilany Abdelhafeez Ahmed
Ministry of Science and Technology, Agricultural Research Corporation
Agricultural Economics Research and Policy Center, Sudan
E. mail: elgilanya@yahoo.com, Mobile: +249911317518

Abstract
Resources use efficiency is critical for Sudanese agriculture. Since resources are economical inputs, the aim should be when optimizing resources use to obtain maximum production per unit. In Sudan, the tenants have compiled numerous crops in order to intensify production in an attempt to improve home food security and income. Field crops such as pulses, food legumes and vegetables are regarded as essential food and cash crops within the prevailed crop combination in Sudan. The paper undertook River Nile State as a case study due to its high potentiality to grow food and cash crops. The crops are commonly produced under pump irrigation from the River Nile. The production of these crops in the State are faced by numerous constraints include inefficiency of resources use, low level of productivity and high cost of production. The paper aims to optimize the available resources use in food and cash crops. Primary data was collected by using structured questionnaires for seventy randomly selected respondents. A linear programming technique was used to assess the optimally combining resources in the crops under study. The model results revealed that tenants would get higher returns by optimizing resources use to the food and cash crops production. The State tenants should therefore, be guided on how to optimally utilize their resources and be encouraged to grow cash and food crops contributed significantly to farm sustainability and alleviates malnutrition in the State.

Keywords: environmental conservation, yield improvement, increasing farm income.

Impact Assessment of Post-Harvest Repayment Deductions on Sugarcane Out Growers' Profitability: A Case Study of Ruembe Cane Growers Association (RCGA).

Lutengano Mwinuka

Sokoine University of Agriculture (SUA)
Department of Agricultural Economics and Agribusiness
P.O Box 3007, Morogoro, Tanzania.

Abstract
This study was conducted at the Kilombero sugarcane out growers' scheme under the Ruembe Cane Growers Association (RCGA) formerly known as Ruembe Out growers Association (ROA). It strived to assess the impact of post harvest repayment deductions on sugarcane out growers' profitability through identifying benefits to farmers participating in sugarcane out growers' scheme; assessing their profitability and analyzing costs to sugarcane out growers. Structured Questionnaire was used as tool of data collection. To accomplish the objectives of the study; data collected, coded, edited and summarized from questionnaires. Then entered into spreadsheet to facilitate different out growers profit calculations in which, total cost with all deductions and without unnecessary deductions identified by farmers subtracted from total revenue. Profitability analysis was done by calculating first the farmer's gross revenues, second gross cost and third profit obtained with respect to their all deductions and unnecessary deductions inclusion. Furthermore, Based on the findings, it was observed that, there was significance differences in farmer's profitability, as all deductions included and exclude unnecessary deductions (Tanzania Sugarcane Growers Association 'TASGA' and 'CESS' levy) in profit findings. The analysis shows enough evidence that unnecessary deductions identified had significance impact to farmer's final profit. In addition to those findings farmers have been subjected to many deductions and higher costs to their general involvement in cane production compared to other crops grown with less response from the association management. Not only that but also farmers participating in sugarcane out growers' scheme benefited through market assurance of their canes to the factory, association price determination and negotiation representation, possibility of getting loans and other credit facilities and guarantee of infrastructure services during rain season. However, Double payments, roles contradiction to some deductions and high transport costs because of inaccurate farm registration are some of problems need contemplations and elucidations to Tanzania sugarcane out growers.

Key words: Profit; out growers' scheme; gross; unnecessary deductions; Tanzania.

Development of appropriate surveillance systems for honeybee pests and diseases for improved production of honey and other bee products in Uganda

Dr. Robert Kajobe
Head of Apiculture Research Programme
National Agricultural Research Organisation (NARO)

National Livestock Resources Research Institute (NaLIRRI)
P.O. Box 96, Tororo, Uganda
Telephone:+256-772-590482
Fax: +256-41-321070
E-mail: robertkajobe@hotmail.com

Abstract
Beekeeping in Uganda is important as a source of food, employment, rural poverty alleviation, environmental conservation and diversification of the export base. Bee products (honey, beeswax, propolis and royal jelly) are essential for pharmaceutical and cosmetic industries. Honeybees pollinate various crops, but farmers know little about their economic importance. The expanding international market for special flavoured and organic honey is unexploited in Uganda. In 2005, the European Union licensed Uganda to export honey to its market, thus creating an immense opportunity. In order to produce and export honey, Uganda must maintain a large, healthy bee population. However, there is inadequate information on bee pests and diseases in the country. It is suspected that colony populations in the country are declining due to pests and diseases; this has negative effect on productivity. There is need to manage the major pests and pathogens that affect honeybees and thus the quality of their products. Effective eradication programmes require efficient honeybee pest and disease control systems to be in place, but this has yet to be established in Uganda. This study aimed to develop an appropriate surveillance system for honeybee pests and diseases to improve the quality of honey and other bee products in Uganda. Specifically, it 1) documented the pests and diseases of honeybees in the different agro-ecological zones; 2) assessed the prevalence of pests and diseases affecting honeybee; colonies; 3) examined and documented organic (bee-safe) methods of pests and diseases 4) engaged beekeepers and other stakeholders in dialogue for experience sharing in honeybee pests and disease control methods.

Keyword: Honeybees, surveillance, pests and disease, export market.