K4D Newsletter
July/August 2014

"K4D lets scientists and policy makers express themselves"

Join and stay informed K4D website **Subscribe to K4D newsletter**

New dossier and feature articles

Enhancing the sorghum value chain

Sorghum is crucial for food and nutritional security for over 300 million people, particularly for communities living in arid and semi-arid lands in sub-Saharan Africa. Its ability to grow in harsh environments where other crops would not survive is an added advantage. Sorghum has also been endorsed by the regional economic communities in sub-Saharan Africa as one of the strategic commodities for targeted investments. In addition to its food use as grain or in syrup, it has wider commercial potential for the production of fodder, alcoholic beverages (e.g. beer) and biofuels. While in the past sorghum had attracted less research investment than other staple crops e.g. cereals such as wheat, rice and corn, sequencing of the genome has provided added opportunities for varietal improvements including enhancing nutritional properties and boosting yield under a range of conditions. Researchers all over the world in both developed and developing countries are conducting research on this crop.
Our new dossier provides access to lead opinion pieces, and links to documents, projects and related websites covering a range of issues including genetic enhancement of sorghum, bio-fortification and improvement of its nutritional value, key research areas, and aspects of value chain development including public-private partnership and the potential for sweet sorghum for environmentally sustainable fuel production.

Commissioned by CTA. Edited by CABI, KIT, and CTA.

Explore the new dossier on our website

Sorghum in Africa: research opportunities and priorities

Eva Weltzien, International Crops Research Institute for the Semi-Arid Tropics, Mali

In her lead article, Eva Weltzien, principal scientist at ICRISAT-Mali describes how sorghum breeders across Africa have been able to develop improved varieties resistant to *Striga*, and tolerant of high salinity and low phosphorus conditions using local landraces, as well as reintroduce landraces that may have been lost. She notes that the germplasm base must be well known and understood and particular varieties chosen appropriately and in consultation with local stakeholders and farmers to know what varieties might be most suitable. Due recognition of the local knowledge which guides the final selection is critical.

Read the article

Potential for sorghum in food security and economic development among communities in arid and semi-arid lands in Africa

Florence Wambugu, CEO and Nehemiah Mburu, Business & Project Manager, Africa Harvest

In their lead article, Florence Wambugu and Nehemiah Mburu of Africa Harvest describe how the Africa Harvest organisation is partnering with international research centres of the CGIAR and local national agricultural research institutes (NARIs) to improve the crop. Examples from Kenya and Tanzania show that improved access to high-quality certified seeds, intensification of production and adoption of good agronomic practices have led to increased productivity, stronger market links and higher volumes being traded between the two countries.

Read the article

Sorghum: selected resources

Sorghum value chain incubator launched in Kenya

Launched on 14 March 2014, at the Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya, the Sorghum Value Chain Development Consortium (SVCDC) trains agribusiness graduates, gives them hands-on experience and supports them to start SMEs. The incubator programme gives guidance to start-up business from conceptualisation; supports start-ups with expertise and facilities; and provides services to commercial clients who want to expand, diversify, create new products or enter new markets. SVCDC is one of the six Agribusiness Innovation Incubation Consortium (AIIC) in Africa, an initiative of the Forum for Agricultural Research in Africa (FARA under the African universities, Business and Research in Agricultural innovation (UniBRAIN) programme.

(ANAFE, 02/05/2014)

Sorghum in a crop rotation can provide significant benefits

Bob Fanning, extension plant pathology field specialist at the South Dakota State University, USA, explains why growing sorghum in a crop rotation can help mitigate risks associated with droughts. Fanning argues that each crop that can be integrated into agricultural production systems offers more flexibility of intensity and diversity, which especially contributes to the sustainable profitability of no-till production systems. Sorghum shares the water use efficiency of other warm-season grass crops and can serve as a rotational crop to help control Goss' Wilt, a bacterial disease that can seriously plague maize producers.

(Plant management Network, 29/04/2014)

Specific variety of sorghum increasingly being used in beer brewing in Kenya

In May 2014, the Kirinyaga County government in Kenya distributed 2,000 kg of free *Gadam* sorghum seeds to resident farmers of the South Ngariama settlement scheme. *Gadam* is a semi-dwarf sorghum variety with a white colour, low tannin and a high starch content. The *Gadam* variety is genetically distinct from the landraces and shows limited introgression from the other genetic clusters. It is genetically uniform and complies with certified control. Originating in Sudan, *Gadam* was officially introduced in Kenya as a food crop in 1972 but then re-launched as an industrial crop in eastern Kenya in 2004 for the production of beer, for which it is better suited. Farmers are expected to earn substantial income from the sale of *Gadam* sorghum to the Kenya Breweries Limited (KBL).

(Agro.biodiver.se, 07/05/2014)

The role of varietal attributes on adoption of improved seed varieties: the case of sorghum in Kenya

Anne Gesare Timu, of ILRI and colleagues from the University of Nairobi and the Tegemeo Institute of Agricultural Policy and Development, Kenya examined the effect of variety attributes on adoption of improved sorghum varieties in Kenya. Using data from a random sample of 140 farmers, a multivariate probit was used to identify variety-specific drivers of adoption. Farmers perceived that improved varieties had desirable production and marketing attributes while the local varieties had the best consumption attributes. The major attributes driving rapid adoption of sorghum varieties were taste, drought tolerance, yield, ease of cooking, and the ability to fetch a price premium. Early maturity, a major focus of research was found to have no effect on the adoption decision. The findings of the study implies that breeders should focus more on non-yield attributes like taste and ease of cooking to increase adoption and satisfy the multiple needs of the farmers.

(Agriculture & Food Security, 09/05/2014)

Influence of ethnolinguistic diversity on the sorghum genetic patterns in subsistence farming systems in Eastern Kenya

Researchers from CIRAD, IRD and their partners have recently demonstrated that sorghum genetic diversity distribution in eastern Kenya was linked to the ethnolinguistic origin of farmers. The researchers took stock of local sorghum varieties grown by households from three ethnolinguistic groups. They characterised the structure of sorghum genetic diversity within the three areas and tested the link with farmers' ethnolinguistic structures. Distribution of sorghum varieties was associated with ethnolinguistic structures. Introduced varieties, obtained through the formal varietal improvement system, were uniformly distributed within the three ethnolinguistic groups, while several local varieties identified by the farmers were unequally distributed among these groups. This work emphasized the relevance of the local scale for studying the evolutionary processes of crops.

(PLOS One, 06/2014)

Biofortified sorghum: lessons for biotechnology

Experiences with implementing the Africa Biofortified Sorghum (ABS) project that seeks to develop a more nutritious and easily digestible sorghum variety are described. It is argued that the project has contributed significantly to the strengthening of African scientific networks. Other issues reflected upon are: the role of the private sector; intellectual property; biosafety and regulatory capacity; funding; communication issues and the balancing of commercial interests and country needs.
(B4FA, 2013)

Sustainability and effectiveness of artisanal approach to control mycotoxins associated with sorghum grains and sorghum based food in Sahelian zone of Cameroon

Sorghum is largely produced and consumed by the local population in the soudano-sahelian region of Cameroon. Public health problems related to mycotoxins are not found in the region and whether sorghum and sorghum products avoid mycotoxin contamination or whether local postharvest practices are effective against mycotoxins is considered. The observed low incidence levels of mycotoxins in raw dry sorghum grains from northern Cameroon could be linked to pre- and post-harvest strategies to prevent crop contamination e.g., yearly crop rotation, irrigation in hot and dry weather, use of pesticides to reduce insect populations, the drying of crops to a safe moisture level, and protective storage.
(InTech Publishers, 2013)

Assessment of genetic diversity of sorghum (*Sorghum bicolor* L. Moench) genotypes under saline irrigation water based on some selection indices

Many areas potentially suitable for sorghum cultivation have to deal with increasing soil salinities and fresh water supplies needed for food production are getting scarcer. This study identified and evaluated the efficiency and profitability of salt-tolerant sorghum genotypes for cultivation in salt-prone areas. It assessed the extent of genetic variation among 22 sorghum accessions from different origin under saline irrigation water using salinity indices. Some of the introduced genotypes (G7, G8, G9, G11 and G14) are better suited to high-saline irrigation than the local. Further research at field level should evaluate green yield production and whether to use them as genetic resources in plant breeding programmes.
(Australian Journal of Crop Science, 2013)

An assessment of the physiological quality of sorghum (*Sorghum bicolor* L. Moench) seeds planted by farmers in Bomet district of Kenya

Sorghum yields are still fairly low in Bomet District of Kenya and this may be attributable to the use of low quality seed. More than 25% of sorghum seeds are of inadequate quality in relation to germination and vigour tests performed. This represents a risk for loss of valuable genotypes and can lead to poor crop yield in future when seeds of such inferior quality continue to be regenerated. Further research is

recommended on the sanitary, analytical and genetic aspects of seed quality. More seed vigour tests need to be performed on sorghum seeds to standardise appropriate protocols.
(African Journal of Food, Agriculture, Nutrition and Development, 2012)

Breeding strategies for adaptation of pearl millet and sorghum to climate variability and change in West Africa

Developing variety types with high degrees of heterozygosity and genetic heterogeneity for adaptation traits helps achieve better individual and population buffering capacity. Traits that potentially enhance adaptive phenotypic plasticity or yield stability in variable climates include photoperiod-sensitive flowering, plastic tillering, flooding tolerance, seedling heat tolerance, and phosphorus efficiency. Farmer-participatory dynamic gene pool management using broad-based populations and diverse selection environments is useful to develop new diverse germplasm adapted to specific production constraints including climate variability. For sustainable productivity increase, improved cultivars should respond to farmer-adoptable soil fertility management and water harvesting techniques. Larger-scale, on-farm participatory testing will enable assessments of varietal performance under evolving climatic variability, provide perspective on needs and opportunities, and enhance adoption. Strengthening seed systems will be required to achieve sustainable impacts.
(ICRISAT, 2012)

Production and quality evaluation of complementary food formulated from fermented sorghum, walnut and ginger

This study evaluates the effect of sorghum and walnut variation on physicochemical properties and acceptability of breakfast meal to overcome protein malnutrition. The nutritional and textural qualities of sorghum flour were improved with the addition of walnut and ginger flour. Samples with 25% walnut and 5% ginger were more acceptable than the samples containing 15% walnut and 5% ginger, 35% walnut and 5% ginger, 45% walnut and 5% ginger. Processing of sorghum into flour and porridge will encourage use of sorghum in other forms. Fortification of sorghum with walnut and ginger flour makes the food more nutritious.
(Journal of Applied Biosciences, 2012)

Sorghum breeding in Sub-Saharan Africa

This booklet generally attempts to highlight the strategies and achievement of sorghum breeding on the sub-Saharan Africa and identify the priority areas for the future approach for greater impact.
(African Biotechnology Stakeholders Forum, 2010)

Sorghum biofuel / sweet sorghum beer value chains. Economic evaluation of sweet sorghum in biofuel production as a multi-purpose crop: the case of Zambia

The potential trade-off in producing sweet sorghum instead of grain sorghum is examined. Identifying high sweet sorghum yielding varieties and the best production scenario are very important pre-requisites to using sweet sorghum in biofuel production. The yield of sweet sorghum is positively correlated with how advanced the production regime is. Due to a negative gross margin obtained under the small-scale production scenario, the results suggest that pro-poor measures should be implemented by any policy aimed at increasing the social benefits (significant contribution of biofuel to the rural poor of Zambia) of a biofuel programme.

(Dissertation, University of Fort Hare, 2008)

CTA and S&T policy

CTA / RUFORUM / Wageningen UR Deans Workshop "Improving Food and Nutrition Security Outcomes: What Role for Universities?"

As a side event of the RUFORUM Biennial Conference 2014, this CTA workshop intends to expose African deans to the Auditing Instrument for Food Security in Higher Education (AIFSHE) tool and methodology for increasing university engagement (leadership), quality (content and process-wise) and relevance (with respect to the market as well as with the policy makers) in addressing the Food and Nutrition Security (FNS) challenge. The objective is to garner their feedback on the utility of the tool and identify areas for improvement and the next steps for up-scaling FNS in Tertiary Agricultural Education (TAE) for influencing policy and practice and improving food and nutrition outcomes in Africa and beyond.

CAAST-Net Plus Magazine Issue 3, June 2014

Topics in this issue of the CAAST-Net Plus magazine include: ST&I and the EU-Africa Policy Agenda; EU-Africa Health Research Cooperation; EU-Africa Platform for Climate Change Research Cooperation; Food & Nutrition Matters in the EU-Africa Partnership (by Judith Francis of CTA and Gerard Ralphs); Horizon 2020 know-how; Strategic Communication and Networking.

PACE-Net Plus Bremen Conference & Think-Tanks

At the PACE-Net Plus Conference in Bremen Germany from 9 to 11 September 2014, participants will identify priority areas for future joint research cooperation between Europe and the South Pacific to address the global challenges, and identify funding options and potential participating institutions. These areas will be discussed in three Think-Tanks (Non-Communicable Diseases; Science and traditional knowledge in aqua- and agriculture – CTA/ZMT; Managing environment, water and wastes), which are interactive sessions for exchanging ideas, thinking about future needs/priorities and providing recommendations.

The Conference has long-term, medium-term, and short-term objectives. The recommendations of all Think-Tanks will feed into the ongoing bi-regional policy dialogue which seeks to enhance scientific and technological cooperation on the decision maker level.

Focus on extension policy

We continue our focus on extension policy. Extension is a key service especially for enhancing smallholder farmer responsiveness to the challenges of food insecurity, building resilience in agricultural systems under a changing climate and improving prosperity in the agricultural and rural sectors. In this issue, we feature selected policy papers that were published on the recently released Extension CD-ROM Proceedings. These papers authored by A.A. Ladele, Nigeria; B.E. Swanson, USA; I. Scoones and J. Thompson, UK; L. Kachale and M.A.T.J. Mapila, Malawi; and P.B. Rwamigisa *et al*. provide useful insights for charting future extension policy in developing countries.

Approaches to private agricultural extension service delivery in Africa: Lessons from current development initiatives in Nigeria

A.A. Ladele, University of Ibadan, Nigeria

Ladele notes that despite the common belief that Africa is not ready for privatised extension services due to the public goods nature of such services provided to date and the limited means of smallholder farmers, a number of development initiatives are paving the way for privatised extension.

Developing innovative, pluralistic extension systems in a changing global economy

B.E. Swanson, University of Illinois at Urbana-Champaign, USA

Swanson outlines the key functions of agricultural extension systems and describes the role of private-sector firms, non-governmental organisations (NGOs) and public extension services in moving towards more innovative extension systems.

The politics of seed in Africa's green revolution: Alternative narratives and competing pathways

I. Scoones and J. Thompson, University of Sussex, UK

Thompson and colleagues draw on lessons from Kenya, Malawi and Zimbabwe to assess the evolution of seed system policy processes across the region and the potentials and limitations of the agro-dealer

model. By examining how contrasting politics and different configurations of interests are affecting this agenda, they highlight opportunities for reshaping the terms of the debate and opening up alternative pathways to more sustainable and socially just seed systems.

Quality versus quantity of agricultural extension services in rural livelihood improvement in Malawi

L. Kachale and M.A.T.J. Mapila, Group Ideas for Community Development, Malawi

Kachale and Mapila assessed the effectiveness of the innovation systems concept in enhancing agricultural extension services for livelihood improvements in the central region of Malawi. Using quasi-experimentation with propensity score matching to establish a valid counterfactual and single differencing to measure impact. It was shown that the frequency of extension contact did not lead to greater livelihood outcomes. Households in communities with less extension contact but who were involved in collaborative developmental agendas and initiatives driven by innovation systems concepts exhibited greater positive livelihood outcomes.

The challenge of reforming national agricultural extension systems in Africa: The case of Uganda's policy reform process 1996–2011

P.B. Rwamigisa et al., Ministry of Agriculture, Animal Industry and Fisheries, Uganda

Rwamigisa and colleagues observe that after years of extension reform efforts in Africa, there is still a considerable lack of knowledge on how to provide cost-effective agricultural advisory services that respond to smallholder needs. Analysing the case of Uganda's National Agricultural Advisory Services (NAADS), which represents one of the most far-reaching extension reforms in Africa. They question why an extension reform project that received worldwide attention did not yield more satisfactory results.

Developments and publications

Sustainable intensification: a new buzzword to feed the world?

Ian Scoones, at Future Agricultures, reviews the literature on 'sustainable intensification' (SI) in particular at what differentiate the concept of 'sustainable agriculture' from the one of 'sustainable intensification', only to find a 'crisis' narrative. Scoones notes that a social and political analysis is absent, a fact that undermines the approach. He concludes: 'For SI to be anything more than a rather odd collection of technical solutions, the questions of socio-technical choice and direction must be put at the forefront. This means having a political debate, and bringing in people more centrally, something that may jar with the rather bland techno-economic prescriptions offered to date.'

(Futures Agricultures, 16/06/2014)

Science, policy, and the transparency of values

Guiding principles for communicating scientific findings in a manner that promotes objectivity, public trust, and policy relevance have been proposed by Kevin C. Elliott (Michigan State University, US) and David B. Resnik (National Institute of Environmental Health Sciences, US) . These are based on current ethical, conceptual, and empirical studies of objectivity and conflicts of interest in scientific research. Both conceptual and empirical studies of scientific reasoning have shown that it is unrealistic to prevent policy-relevant scientific research from being influenced by value judgments. Conceptually, the current dispute over an EC report on its regulatory policy for endocrine-disrupting chemicals illustrates how scientists were forced to make value judgments about appropriate standards of evidence when informing public policy. Empirical studies provide further evidence that scientists are unavoidably influenced by a variety of potentially subconscious financial, social, political, and personal interests. The authors conclude that when scientific evidence is inconclusive and major regulatory decisions are at stake, it is unrealistic to think that values can be excluded from scientific reasoning. Thus, efforts to suppress or hide interests or values may actually damage scientific objectivity and public trust, whereas a willingness to bring implicit interests and values into the open may be the best path to promoting good science and policy.
(Environmental Health Perspectives, 01/ 07/2014)

Universities as potential actors for sustainable development

In their paper, Michael von Hauff and Thuan Nguyen of the Technische Universität in Kaiserslautern, Germany argue that Universities can contribute to solutions for major challenges of the 21st century such as increasing environmental and socio-economic crises, inequalities of income and wealth, and political instabilities by integrating the concept of sustainable development (SD) in research, organisation, and by educating future decision makers. Through university curricula, future decision makers can learn the competences needed to solve ecological, social, and economic problems in societies. The authors discuss the observation that universities in Germany fall behind internationally in implementing sustainable strategies and present an approach to how universities can implement the holistic concept of SD. They further analyse the current state of implementing sustainability strategies at universities, and how the success of these implementation efforts can be evaluated and fostered.
(Sustainability, 19/05/2014)

Laying the foundation for trans-disciplinary faculty collaborations: actions for a sustainable future

In this special issue on 'Education and Skills for the Green Economy', Linda Vanasupa of California Polytechnic State University and colleagues present an answer to how academics can successfully participate in trans-disciplinary projects. Based on their own experience in an ongoing research cooperation programme, the authors offer a post-industrial era metaphor for trans-disciplinarity – that of a complex dynamic system – that helped them work through the unexpected encounters in the process of transformative learning. They describe the systemic conditions that are repeatedly reproduced including: conflict, existential crisis, transformation and renewed vitality which would have been overlooked or

interpreted as a hindrance to their work. These insights serve as socially robust body of knowledge to support the effective participation of academics in projects of a trans-disciplinary nature.
(Sustainability, 14/05/2014)

Academic self-publishing: a not-so-distant-future

The Open Scholar C.I.C. argues that the current structure of scientific journals is restraining scientific progress, caused by rejection rates and lack of access. They see the urgent need for academic self-publishing. Open Scholar proposes LIBRE, a five step bottom-up workflow that will help the science community move from competition to collaboration and from closed to open access.
(Open Scholar C.I.C, 19/06/2014)

Interpreting academic studies: a primer for media

Justin Feldman lists a series of question every science journalist should ask when reporting on a new scientific study. His article is part a *Journalist's Resource* (JR) project, that examines news topics through a research lens. Feldman's guide looks at how a journalist should understand a research project's hypothesis, variables, unit of analysis, causation logic (such as Randomised Controlled Trials, systemic reviews or meta-analysis for example), results generalisation potential, intrinsic limitations and conclusions.
Editor's note: The following annotation offers a great example of insightful journalism, where a difference in field research methodology can influence the end results in a surprising way.
(Journalist's Resource, 27/05/2014)

Behavioral responses and the impact of new agricultural technologies: Evidence from a double-blind field experiment in Tanzania

The results of a recent paper published in the *American Journal of Agricultural Economics* comparing Randomized Controlled Trials (RCT) conducted with cowpea farmers in Tanzania, using an open RCT with a double-blind RCT (used in medical science) were discussed by Venezuelan journalist and blogger Francisco Toro. The results were surprising and put into question the standard methodology that agricultural scientists commonly use to assess the success of the introduction of new agricultural technologies. Toro sums it up: 'In the open RCT, Tanzanian cowpea farmers who knew they were getting improved seed easily outperformed farmers who knew they were getting traditional seed. But in the double-blind study, farmers who weren't told whether the seed they got was improved or not performed just as well whether that the seed they received was improved or traditional. In fact, farmers who used traditional seed without knowing it did just as well as farmers who used improved seed, whether they knew it or not. Only farmers who knew the seed they were given wasn't improved lagged behind in productivity.'
(Francisco Toro's blog, 09/04/2014)

Fake seeds force Ugandan farmers to resort to 'bronze age' agriculture

Counterfeiting gangs in Uganda are dyeing regular maize so that they have the characteristic pinkish orange colour of industrially processed maize seed. *The Guardian* reporting on the dire state of Uganda's seed system concludes that an apparent illegal industry has developed cheating farmers by selling them seeds that promise high yields but fail to germinate. The result is a crisis of confidence in commercially available high-yield seed. 'The seed market is very small compared to what you would expect from the returns to these hybrid seeds', says David Yanagizawa-Drott, a professor at the Harvard Kennedy School and part of a team currently researching the problem. A pilot study conducted 18 months ago 'found significant amounts of hybrid seeds that were falsified'.

(The Guardian, 08/04/2014)

Destructive pest threatens PNG's coffee crop

Tom Kukhang from Papua-New-Guinea's (PNG) Coffee Industry Corporation and coffee growers on the island fear that a berry borer pest could have a devastating impact on the industry. The pest is reportedly just 20 kilometres from PNG's border with Indonesia and could largely destroy PNG's coffee crop. The nation's quarantine organisation NAQIA and the Coffee Industry Corporation are currently working together to provide surveillance in border areas and major ports.

(Radio Australia, 30/05/2014)

Understanding disease resistance genes in crops to secure future food production

Dr Henrik Stotz from the School of Life and Medical Sciences at the University of Hertfordshire, UK and Pierre de Wit from Wageningen UR in The Netherlands have proposed a new concept called effector-triggered defence or ETD that explains how plants protect themselves against the pathogens that grow in the space outside plant cells (the apoplast).This new insight could help scientists breed new, more successful disease-resistant agricultural crops. By exploiting new molecular and genetic insights, their research has provided a better understanding of the defence system of crop plants against the damaging pathogens that grow in the spaces between plant cells.

(AlphaGalileo, 27/05/2014)

The Worldwide Integrated Assessment of the impact of systemic pesticides on biodiversity and ecosystems

The Task Force on Systemic Pesticides, a group of European scientists created in 2009, has published the single most comprehensive study of neonics, *Worldwide Integrated Assessment of the impact of systemic pesticides on biodiversity and ecosystems* (WAI). The WAI has examined over 800 scientific studies carried out in the last five years, including those sponsored by industry. Some aspects of this analysis have been broadly acknowledged (e.g. risks to honeybees), but some have not (e.g. risks to birds,

earthworms, other pollinators and aquatic invertebrates). Relatively few studies have specifically focused on biodiversity and ecosystem impacts and this analysis moves understanding forward in a much more holistic and extensive way.
(Task Force on Systemic Pesticides, 17/06/2014)

Obstacles to integrated pest management adoption in developing countries

Integrated pest management (IPM) has hardly been adopted in developing countries, despite its theoretical prominence and sound principles. These are the findings of a research project conducted by scientists from CIAT, IRD, CIP, University of Greenwich, Cornell University and Wageningen UR. They found 51 potential reasons why IPM adoption by developing country farmers is low. The most frequently mentioned obstacle was 'insufficient training and technical support to farmers'. Different adoption obstacles were identified than in high-income countries. Developing-country respondents rated 'IPM requires collective action within a farming community' as their top obstacle to IPM adoption. Respondents from high-income countries prioritised the 'shortage of well-qualified IPM experts and extension workers'.
(Proceedings of the National Academy of Sciences and IRD (FR), 25/02/2014)

Molecular genetics: science and technology regulation

In early 2014, MS Swaminathan Research Foundation (MSSRF) in India conducted the 23rd Annual Dialogue series. The focus of the Dialogue was to provide important inputs to the Regulatory Authority Bill that is before the Indian Parliament for the approval and commercialisation of genetically modified crops. The Foundation brought together all stakeholders in the agriculture sector, including molecular biologists, plant breeders, farmers' associations and civil society representatives from both national and international institutions, to help produce definite guidelines. Seven key recommendations emerged, in particular: Well-designed needs assessment to facilitate decisions on publicly funded GM research; decisions should be based on the precautionary principle; genetic literacy at the grassroots level about GM crops; hidden hunger and the micronutrient deficiency can be largely eliminated by integrating nutritionally rich crops and plants and promoting nutri-farms or homestead gardens.
(Agriculture & Food Security, 12/05/2014)

A global initiative to collect, conserve, and use crop wild relatives

This paper by Hannes Dempewolf and colleagues of the Global Crop Diversity Trust, Germany, and the Royal Botanic Gardens in Kew, UK, informs researchers interested in the 'Adapting Agriculture to Climate Change' initiative and to encourage them to start collaborating under its umbrella. The authors explain that the main objective of the project is to collect and protect the genetic diversity of a range of plants with characteristics that are required for adapting the world's most important food crops to climate change. The initiative also makes these plants available to plant breeders who can readily use them to produce varieties adapted to the new climatic conditions.
Editor's note: What mechanisms are in place to ensure equal access to the genetic diversity collected

and that countries derive economic and social benefits from any sale or profits from their indigenous resources?

(Agroecology and Sustainable Food Systems, 18/02/2014)

Kram-kram is the edible and highly nutritious grain

Kram-kram (cram-cram) is the edible and highly nutritious grain from *Cenchrus biflorus*, a perennial grass. The grain is rich in protein and has perhaps the highest calorie content of any grain, but today it is only collected when the harvests of other grains are insufficient to feed the community. The Tuareg people in Mali traditionally collect Kram-kram as a wild cereal. To be used, the seeds need to be hulled in a mortar, extracting the white grain from its spiny covering. The grains can be pounded and eaten raw, made into porridge, or mixed and cooked with other foods. During the rainy season, the plant can be harvested more than once. It can be preserved in traditional silos, where fermentation softens the spines enough so that it can be eaten by animals. Kram-kram grass grows very well in the sand and needs little water. Many more underused species for agriculture and food production can be found on the online database 'The Ark of Taste'.

(Slow Food Foundation for Biodiversity, 2014)

Bean genome sequencing yields uncommon findings

A team of researchers from the University of Georgia, U.S. Department of Energy Joint Genome Institute, Hudson Alpha Institute for Biotechnology, North Dakota State University and University of California Davis has recently released the genome sequence for the common bean – which includes a number of varieties that together rank as the world's 10th most widely grown food crop. The new whole-genome sequencing will also help to identify genetic 'markers' that can be used to speed up breeding of new bean varieties in the United States, East Africa and other countries. All of the well-known bean varieties have the highly valued ability to form symbiotic relationships with 'nitrogen-fixing' bacteria in the soil. One of the goals of the sequencing project was to better understand the genetic basis on which symbiotic relationships between nitrogen-fixing plants and bacteria are formed and sustained. The new sequencing identified a handful of genes involved with moving nitrogen around, which could be helpful to farmers who intercrop beans with other crops that don't fix nitrogen. The researchers also discovered dense clusters of genes related to disease resistance within the chromosomes.

(UC Davis, 09/06/2014)

Commercial substances obtained from native plants

Researchers at the Mexican Scientific Research Center of Yucatan (CICY) studied 20 native species forexploration, recollection, characterisation and conservation of native herbs in the region. . They built a pilot distillation kit to obtain essential oils from plants and to do bioactivity tests and product development. In this publication, Luz Maria del Carmen Calvo Irabién, head of research, explains that the essential oil from Mexican oregano (*Lippia graveolens*) has potential in the agroindustry and that

basil bush (*Ocium campechianum*) has antioxidant, antimicrobial and antifungal properties and high concentrations of eugenol, an aromatic agent widely used in the cosmetic and fragrance industry. *Note:* For example, science competition winner Stella Kabiri-Marial demonstrated that invasive *Cymbopogon afronardus* (Stapf) could be used as a natural insecticide. K4D has recently also highlighted the pioneering work of Ameenah Gurib-Fakim on novel plant bio-resources.
(AlphaGalileo, 19/06/2014)

Effect of three storage methods on the quality and shelf-life of white yam cultivars

Bonaventure Kissinger Maalekuu, of the Department of Horticulture, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana and colleagues conducted a survey to assess the pre-storage treatments applied to yam, methods adopted for storage and farmers knowledge on postharvest losses. In addition a proximate analysis to determine the nutritional variation of White yam cultivars, Pona and Tela, was conducted before and after storage. The survey revealed that only few farmers apply agro-chemicals to their harvested tubers before storage. Yam is stored in yam barn (major method) or stored in heaps on a floor or in open sided structures, depending on time of harvest. All three storage methods caused a significant reduction of the nutritional composition of the tubers. The open sided storage structures performed best with respect to lower weight loss, sprouting, decay, pest damage and nutritional composition.
(Journal of Agricultural Science, 15/06/2014)

Tunnel greenhouses for smallholder farmers in Fiji and Samoa

Research on tunnel greenhouses offers smallholder farmers in Fiji and Samoa opportunities to grow produce and supply markets regardless of seasonal weather changes and island topography. Dr Richard Markham, Pacific Crops research programme manager at ACIAR, explains how using tunnel greenhouse technology in combination with irrigation allows for crop production all year round. Standard greenhouse structures can with some minor adjustments withstand tropical storms (removable roof and walls), excessive heat (shade cloth and taller structures), and pests out (netting).
(ACIAR, 21/05/2014)

Reducing food waste by households and in retail in the EU

The EC commissioned LEI Wageningen UR this study to investigate what the effects of a 40% reduction in food waste at the household and retail level would be on the economy. The study shows that such reduction could result in annual savings of € 123 per person and the total savings for the EU of € 75.5 billion. However, the total effect on the EU economy will be negligible. The reduction in food waste on the demand side (household and retail) will mean that much less agricultural land will be needed for growing food (in the EU, agricultural land use will be reduced by 28,940 km2 – an area of the size of Belgium). Most of this agricultural land will be freed up because of a reduction in waste of dairy products, fruits and

vegetables and red and white meat. The study reveals however that results would be greater if European households would adopt healthy eating patterns in terms of lowering consumption of meats and dairy instead of reducing food waste. Follow-up research is necessary to determine what the results would be of reducing food losses on the supply side (agriculture, the processing industry, storage and transport) and food losses and waste in the rest of the world.

Editor's note: ACP governments need similar evidence from their national and regional universities to support decision-making.

(LEI Wageningen UR, 16/04/2014)

Family farming and prospects – challenges and prospects: in-depth analysis

This document discusses the definitions, challenges and future prospects of family farming in the EU. It provides: (i) a definition of the concepts of family farming and an overview of the main figures available; (ii) an examination of the current and new challenges in economic, demographic, sociological and territorial terms; and (ii) an analysis of the future prospects for family farming. The authors, Sophia Davidova, University of Kent, UK and Kenneth Thompson of the University of Aberdeen, UK argue that the main economic challenges to family farms are access to farming resources such as land and capital, and access to markets, particularly in terms of bargaining power in the food chain. One of the key economic drivers of future changes within the family farming sector is the differential between farm incomes and incomes in the rest of the economy. Technological progress and structural change will offset certain disadvantages of some but not all family farms in respect to economic efficiency. More knowledge-intensive and innovative management will allow some family farms to grow, capture economies of scale, and maintain and increase their competitiveness in the European and world market. Family farming – often by pluri-active and diversified households – is likely to continue to dominate EU farming structure despite trends towards larger non-family farms.

(European Parliament, 04/2014)

Digital agricultural clearing house 'AgroCentral' to be launched in Jamaica

AgroCentral will be a web and SMS application connecting small farmers directly with buyers. The idea for this app was born at a Startup Weekend Jamaica (SWJA) in October 2013 and will be launched in August 2014. AgroCentral uses an eBay-like model allowing farmers to alert buyers via SMS when they have a crop they wish to sell, helping them to cut out the middleman, negotiate higher margins and gauge supply and demand in the market. Farmers simply send an SMS to a central website, quoting the type of product on offer, the quantity available and their desired price. Buyers can either view these posts on the AgroCentral website or – if they have registered interest in buying, they will also receive a SMS. The buyers can directly negotiate with farmers and also send a request to the website. The request will be relayed to all registered farmers who produce that particular crop using SMS. Buyers can also access full profiles of registered farmers, including their location, crops grown and supply capability. The benefit to farmers is that they can quickly find a market for perishable produce.

(Trade & Export Finance, 09/05/2014)

ICSU World Data System (WDS) strategic plan 2014-2018 published

This document, produced in consultation with WDS Members of the International Council for Science (ICSU), outlines five strategic targets that the WDS Scientific Committee (WDS-SC) considers to be important for international collaborative scientific research: (i) make trusted digital data repositories and services an integral part of international collaborative scientific research; (ii) nurture active disciplinary and multidisciplinary scientific data services communities; (iii) improve the funding environment for data services; (iv) improve the trust in, and quality of, open scientific data services; and (v) position ICSU-WDS as the premium global multidisciplinary network for quality assessed data.
(ICSU WDS, 06/2014)

PacGeo: open access geospatial data repository for the Pacific Region

PacGeo is an all-encompassing geospatial platform for cataloguing, administering and exposing geophysical, geodetic and specialist marine spatial data for the Pacific community. PacGeo provides easy access to jurisdictional information and tools for marine spatial planning in the Pacific. The system has been developed by the University of Sydney, Applied GeoScience and Technology Division of Secretariat of the Pacific Community (SOPAC/SPC), Geoscience Australia (GA), and UNEP GRID-Arendal Centre. PacGeo will be launched with finalised datasets by the summer 2014.

iMarine: data e-infrastructure initiative for fisheries management and conservation of marine living resources

iMarine, a project co-funded by the EU under the Framework Programme 7, is an open and collaborative initiative that supports the implementation of an ecosystems approach to fisheries management and the conservation of living marine resources. iMarine provides an open access e-infrastructure that facilitates sharing of a multitude of data, collaborative analysis, processing and mining processing, as well as the publication and dissemination of newly generated knowledge. Practitioners from multiple scientific fields such as fisheries, biodiversity and ocean observation benefit from 'e-infrastructure capacity'; 'application bundles' (access tools by topic modules: biodiversity, geospatial, statistics, interoperability); 'data heterogeneity management'; 'policy best practices'.

Data collected by satellites can accurately measure underground water

In a development that could revolutionize the management of precious groundwater around the world, Stanford researchers Jessica Reeves, Rosemary Knight, Howard Zebker and Peter Kitanidis have pioneered the use of satellites to accurately measure levels of water stored hundreds of feet below ground. Their findings were published recently in *Water Resources Research*. Until now, the only way a water manager could gather data about the state of water tables in a watershed was to drill monitoring wells. In their novel approach, the scientists used Interferometric Synthetic Aperture Radar (InSAR) to monitor changes in the elevation of Earth's surface. With this technology they could measure

groundwater levels across vast areas without using lots of on-the-ground monitors. InSAR data could play a vital role in measuring seasonal changes in groundwater supply and help determine levels for sustainable water use.
(Stanford University, 17/06/2014)

Atlas of African agriculture research and development

The 'Atlas of African Agriculture Research & Development', published by IFPRI, presents a broad range of geospatial data resources that provide insights into the obstacles and opportunities facing smallholding farmers in Africa. Organised around seven themes (footprint of agriculture, growing conditions, role of water, drivers of change, access to trade, and human welfare), the atlas covers more than 30 topics, with maps and supporting text.
(IFPRI, 30/06/2014)

A new global dataset for rainfall monitoring and drought early warning

A new dataset developed by UC Santa Barbara and the U.S. Geological Survey (USGS) can be used for environmental monitoring and drought and famine early warning. The Climate Hazards Group Infrared Precipitation with Stations (CHIRPS), a collaboration between UCSB's Climate Hazards Group and USGS's Earth Resources Observation and Science (EROS) combines rainfall data observed from space with more than three decades of rainfall data collected at ground stations worldwide. This dataset seeks to blend the best qualities of rainfall station observations, satellite temperature data and the unique spatial characteristics of rainfall to create the best available rainfall information for climate and agricultural monitoring. The new dataset allows experts to monitor rainfall in near real-time, at a high resolution, over most of the globe. CHIRPS data can be incorporated into climate models, along with other meteorological and environmental data, to project future agricultural and vegetation conditions.
(UC Santa Barbara, 14/05/2014)

Proceedings of the GlobalFood symposium 2014 (April 2014)

The Second GlobalFood symposium was held in April 2014 in Göttingen, Germany. It focussed on new research findings and policy challenges related to the transformation of the global agri-food system A document containing detailed abstracts of the conference papers is available for download.
(University of Göttingen, 05/2014)

Achievements of the 10th Annual Scientific Meeting of the Caribbean Regional Fisheries Mechanism

The Caribbean Regional Fisheries Mechanism (CRFM) h its 10th annual meeting, in St Vincent and the Grenadines in June 2014. They focused on data collection, quality control, data preparation for analysis, and

analytical methods. Four specific priority areas were formlulated: (i) improving the quality of regional data for the blackfin tuna; (ii) improving data collection systems to facilitate the implementation of the Sub-regional Fisheries Management Plan for the Eastern Caribbean Flyingfish; (iii) developing a data collection and information system for fisheries which use fish aggregating devices; and (iv) collecting and analysing data on the lionfish. Training of data collectors, improvements in national data collection programmes and stakeholder awareness building on the importance of data collection were other critical areas identified for attention. *(CRFM, 25/06/2014)*

Events

Asia Pacific Resilience Innovation Summit 2014

Dates: 15-17 September 2014

Venue: Honolulu, Hawaii

Third Global Science Conference 'Climate Smart Agriculture 2015'

Dates: 16-18 March 2015

Venue: Montpellier, France

Abstract submission deadline: 1 October 2014

Calls

ACIAR Opportunities for post-graduate scholarships

Deadline: 31 July 2014

Applications are now open for ACIAR John Allwright Fellowships for post-graduate study commencing in 2015 at Australian universities. To be eligible applicants must be working on an active ACIAR project in the partner country at the time of application.

Call for articles: Nutritional values and family farming

Deadline: 1 September 2014.

The last issue of *Farming Matters* for 2014 will focus on how family farming and agroecology support the nutrition of family members and the wider community.

Gates foundation: 2014 Program for Emerging Agricultural Research Leaders (PEARLS)

Pre-proposal deadline: 7 September 2014

Call for Research Proposals: CEnter for Synthesis and Analysis on Biodiversity

Deadline: 16 September 2014

The CESAB (CEnter for Synthesis and Analysis on Biodiversity) is an initiative run by the French Foundation for Research on Biodiversity (FRB) to promote high level research activities devoted to syntheses of ideas and/or data analyses in the field of biodiversity. CESAB supports national or international working groups developing syntheses of ideas and concepts, and/or data analyses to improve our understanding of all facets of biodiversity.

Jobs

Postdoctoral Fellow – Participatory Action Research

Deadline: 3 August 2014

The International Livestock Research Institute (ILRI) seeks to recruit a Postdoctoral Fellow to support the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) participatory research activities across East Africa, including coordination of the flagships research activities in the region with CGIAR centres.

To unsubscribe, click here

Publisher: CTA, P.O.Box 380, 6700 AJ Wageningen, The Netherlands

Coordinating editors: Judith Francis, CTA and Rutger Engelhard, Contactivity bv.

Research: Cédric Jeanneret-Grosjean, Contactivity bv

CTA is an institution of the ACP Group of States (Africa, Caribbean and Pacific) and the EU (European Union), in the framework of the Cotonou Agreement and is financed by the EU.