K4D Newsletter
March/April 2015

"K4D lets scientists and policy makers express themselves"

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Introduction

Dear Colleagues,

We are pleased to forward the March/April 2015 issue of the CTA and S&T Knowledge for Development (K4D) e-newsletter. Changes are coming to the K4D web portal and this is the final K4D newsletter. We have, therefore, chosen to capture some of the new thinking and changing dynamics on science, technology and innovation (STI) in agriculture. This is only fitting as STI was the genesis and raison d'être of K4D since it was launched in early 2004. The future looks bright for STI for agriculture and rural development if the momentum is sustained and STI policy and practice are further mainstreamed into national systems which are adequately resourced.

We thank you for being avid readers of the K4D newsletter as well as for frequently visiting and using the K4D web portal. Producing and disseminating the K4D newsletter has been an enjoyable challenge, and we hope that the selection of material we provided, triggered reflection and subsequent action. Your continued support over the years kept us motivated and focused. Enjoy reading the final issue and please stay in touch.
'K4D lets scientists and policymakers express themselves'

Judith Ann Francis, Senior Programme Coordinator Science & Technology Policy, CTA

New feature articles

The Ethics of innovation in agriculture: Inclusivity and reflexivity

By Kristal Jones, Research Associate, National Socio-Environmental Synthesis Center, University of Maryland, USA

Kristal Jones asks whose values and which ethics should drive innovation in agriculture and makes the case for an ethic of innovation in agricultural development that is built on the foundation of inclusivity and reflectivity.
Since innovation is itself a dynamic process that leads to the creation of new things, systems and ideas, 'individuals and institutions must constantly make decisions on which innovation priorities they value and which innovation processes they consider ethical', says Jones. In introducing the topic, she zeroes in on the lessons learned from Norman Borlaug, who described the innovation process as 'neither a stroke of luck nor an accident of nature.' It took Borlaug two decades of research on Mexican wheat varieties using significant amounts of imported seed

from multiple locations to successfully increase food production in Pakistan and India. Jones notes that the research priorities, the research process and the scientific method were interconnected and influenced by many people, including agricultural scientists (with PhDs), as well as by the context (population growth and hunger) within Borlaug's 'innovation process'. The ethic of innovation in agricultural development should recognize and prioritize participatory approaches and indigenous knowledge.

Innovation and inclusive development

By Lynn Mytelka, Professorial Fellow, UNU-MERIT, France

While many small changes that collectively modify products and processes may open up opportunities for including smallholders in the innovation process, Lynn Mytelka anticipates that there are challenges in developing capabilities, strengthening linkages and building a support infrastructure at the local level.

Mytelka reminds us that 'innovation is neither research nor science and technology', and that innovation can take many different forms: from radical changes at the 'frontier of knowledge' to a range of small changes. However, small firms and farms must continuously learn to operate in a changing global environment, and governments must invest in building capacity so that they can access critical knowledge and adapt. Using the case of Columbian cut flowers, Mytelka encourages governments to rethink their current policies and practices, build interactive dialogues with smallholder farmers and create a policy environment that will trigger and support smallholder innovation processes.

Research on higher education and science and innovation policy: Policy implications

By Merle Jacob, UNESCO Chair, Lund University, Sweden

Merle Jacob recommends that in the pursuit of providing broad-based education – primary, secondary and tertiary – policy makers should not sacrifice quality, even though the demands, expectations and the diversity of options for higher education in ACP countries have shifted.

Jacob notes that excellence must be maintained and continuing post higher education certification is necessary for competence building in science and technology. Institutional diversity is therefore not a substitute for investing in publicly funded institutions of higher learning and research as national problems may require local effort and may be invaluable for increasing value added in commodity-dependent economies. Jacob further recommends that successful cases be accessed and interrogated, and that the ACP platform be leveraged for effectively partnering with European higher education organizations. The diaspora may be a source of expertise and guidance that can be tapped to support decision making. Higher education policy is a cornerstone of science and innovation capacity building and the key challenge facing policymakers is how to promote and sustain a national higher education structure that includes a mix of institutions with a global reach and those with more local and national ambitions.

Governance of science, technology and innovation for food security in Africa: A conceptual framework for developing indicators

By John Ouma-Mugabe, Professor Science and Innovation Policy, University of Pretoria, South Africa

John Mugabe believes that despite the increasing importance of the governance of science, technology and innovation, there are no conceptual tools or empirically tested indicators – quantitative or qualitative – to provide the evidence base given the complexity of science–technology–society interactions.
For clarity, and to make the distinction between government and governance, Mugabe identifies three key principles that underlie good governance and institutions: participation, accountability and transparency. The rule of law is at the core. Mugabe also distinguishes between politics and policy making and elaborates on two aspects of STI policy making: policy for STI (e.g. funding, and the pursuit, application, diffusion and adoption of knowledge) and STI for policy (use, organization and application of knowledge to improve decision making). Mugabe proposes a framework as well as indicator areas for the three elements of good governance and recommends that the framework be tested through a series of case studies.

CTA and S&T

Seed systems, science and policy in East and Central Africa – Online

This unique CTA publication provides insights into the various seed systems, the policy and science environment and the challenges faced by governments, universities, the private sector, farmers and other stakeholders in their efforts to ensure the availability of quality seeds, and to ensure that Africa increases its share of the global seed trade. The publication is the direct output of the CTA/ASARECA Seed Science and Policy 'learning writeshop', which was held in conjunction with the 2nd ASARECA General Assembly and Scientific Conference in Burundi in December 2013. The workshop built on the outcomes of CTA's interventions aimed at increasing the engagement of universities in agricultural and rural development policy processes with a primary focus on the Comprehensive Africa Agricultural Development Programme in Africa and supporting selected universities to analyse their contributions to the development of an integrated seed sector. It includes the CTA/ASARECA policy brief. The printed version of the publication is also available and the digital version can be accessed here.

E-version of the auditing instrument for food security in higher education

The CTA/WUR/ACP Universities Auditing Instrument for Food Security in Higher Education (AIFSHE) is an open source tool that is now available online. In 2013, CTA embarked on a collaboration with the Education and Competence Studies Group and the Centre for Sustainable Development & Food Security of Wageningen University and Research Centre, ten universities in Africa, Caribbean and the Pacific, the Forum for Agricultural Research in Africa (FARA) and African regional university networks (ANAFE, RUFORUM, TEAM Africa) to develop the AIFSHE open source tool. In 2014, the draft version of the

AIFSHE tool was used by the ACP universities to audit their food security programmes and determine their vision for the future. Since then the tool has been updated, endorsed by several vice-chancellors, principals and deans in regional fora in Africa and the Caribbean, and has been translated into French. The tool is an adaptation of the Auditing Instrument for Sustainability in Higher Education (AISHE), which enables universities to undertake their own self-assessments and to monitor changes over time based on 20 criteria used in the AIFSHE assessment protocol. If you would like to have access to the online tool please send an email to cta@cta.int reference AIFHSE tool, attention Judith Francis.

ACP Roadmap for unleashing STI for food and nutrition security: Outputs of the CTA international forum, October 2014

The road map to unleash science, technology and innovation (STI) for Food and Nutrition Security (FNS), with a special focus on African, Caribbean and the Pacific (ACP) countries, is the direct output of the CTA 2014 international forum on this theme. The forum addressed four strategic issues: novel pathways for agricultural innovation; optimizing resources (human and physical); the enabling policy and institutional environment; and (iv) identifying the way forward for addressing the global FNS challenge.

It further assessed the associated implications for research and development, higher education, extension and innovation within agricultural and wider national innovation systems. The forum participants noted that while there is a growing body of scholarship on STI for FNS, few attempts have been made to identify good practice and customize these developments for implementation and investment in local/national contexts.

CTA/FARA CD-Rom – 'Feeding 1 billion in Africa in a changing world': Contributions from the 3rd Africa-wide women and young professionals in science competitions

This CD-ROM is a compilation of the research of 40 African scientists who participated in the 3rd Africa-wide Women and Young Professionals in Science competitions *Feeding 1 Billion in Africa in a Changing World* organized by CTA, FARA and partners.

The papers provide insights into the research being undertaken by these highly motivated African scientists aimed at resolving Africa's challenging food and nutrition security situation and the channels they use to communicate their results to influence policy and practice. The publication also highlights the priority areas for further investigation and policy intervention and support. This is an important communication tool for mobilizing additional resources to support the future research endeavours of African scientists, especially women and young people.

Developments & Publications

Developing national systems of innovation: University–industry interactions in the Global South

Interactions between firms and universities are key building blocks of innovation systems, as profiled in this book featuring novel comparative research spanning three continents. The editors (Eduardo Albuquerque of Universidade Federal de Minas Gerais, Brazil, and colleagues) present a universal and dynamic view of the shaping and reshaping of interactions between firms and universities within different countries at various stages of development. Students of innovation, evolutionary economics, science and technology studies and development studies, as well as public research organizations and policy makers, will find the original research to be of great value.
(IDRC, 30/01/2015)

When all models are wrong

More stringent quality criteria are needed for models used at the science–policy interface say Andrea Saltelli of the EC's Joint Research Centre and Silvio Funtowicz at the University of Bergen, Norway. They argue that simple models could enable scientists and stakeholders to understand how assumptions and outputs are linked and that complex and often over-parameterized mechanistic models should be used only for more speculative investigations outside the policy realm. They present a seven-rule checklist to aid in the responsible development and use of models. These are: (i) use models to clarify, not to obscure; (ii) adopt an 'assumption-hunting' attitude; (iii) detect pseudoscience; (iv) find sensitive assumptions before they find you; (v) aim for transparency; (vi) don't just 'do the sums right,' but 'do the right sums'; and (vii) focus the analysis, don't do perfunctory sensitivity analyses, merely changing one factor at a time.
(*Issues in S&T*, 30/01/2015)

Joint EIARD–SCAR working group on agricultural research for global challenges: Policy principles

The Joint EIARD–SCAR Strategic Working Group on Agricultural Research for Global Challenges (ARCH) has recently updated the main Agricultural Research (AR) and Agricultural Research for Development (ARD) policy principles and the linkages between them. It is argued that AR and ARD are increasingly interlinked due to the global scale of challenges such as climate change, food and nutrition security and access to natural resources. This action by the Joint EIARD–SCAR Strategic Working Group ARCH was considered necessary in moving from the Millennium Development Goals towards the Sustainable Development Goals, so as to create sustainable policy alliances on research for global challenges.
(PAEPARD, 25/01/2015)

UNESCO maps research and innovation in Malawi

The research and innovation map of Malawi reveals an intriguing paradox: despite being one of the poorest countries in the world, it devotes 1% of its gross domestic product (GDP) to research and development (R&D), one of the highest ratios in Africa. In October 2014, UNESCO released the third volume in its series of country profiles in Science, Technology and Innovation (STI) policy. Although R&D spending remains low in real terms, Malawian scientists publish more in mainstream journals – relative to GDP – than researchers in other countries with similar populations.
(UNESCO, 12/10/2014)

The political economy of official statistics: Implications for the data revolution in Sub-Saharan Africa

'Big data' has become a topical issue and the recent technological solutions offered by the 'data revolution' to improve the capacity of statistical organizations and systems should be stepped up. In this ECDPM policy paper, F. Krätke and B. Byiers note that the 'data revolution' rhetoric has so far largely ignored political economy factors, such as historical factors, formal and informal institutional setups and actor incentives. They argue that to make a difference, work towards a 'data revolution' must explicitly acknowledge the real political economy challenges on the ground and aim to work within these constraints to improving data, and/or aim to alter the current incentives for producing and using good official statistics. (ECDPM, 12/2014)

Read ECDPM's Policy Brief
More information is available on the Informing a Data Revolution website

Responding to crop failure: Understanding farmers' coping strategies in Southern Malawi

Farmers are not responding directly to climate variability, but to crop failure, which is influenced by climate stress, as well as other constraints, such as poor soil fertility and lack of agricultural inputs and technologies. This is the conclusion of a study examining farmers' coping strategies for crop failure and the determinants of their choices using household level data from rural southern Malawi. The study found that coping strategies adopted by households are mostly ex-post measures. The main determinants of the adoption of coping options appear to be education, the gender of the head of household, soil fertility and the frequency of crop failure. The study concludes by recommending that policies for the more efficient communication of climate change threats should emphasize the risk of crop failure. Furthermore, initiatives to assist households to better cope with climate change should take into consideration the local context of decision-making which is shaped by multiple stress factors.
(*Sustainability*, 03/02/2015)

Optimising the use of water for drip irrigation in Burkina Faso

Wireless sensor technology, adapted to local climatic conditions, which alerts small producers in the semi-arid regions of Burkina Faso on the best time to irrigate, according to the plants' needs, have been developed and tested. This new technology is based on low-cost wireless weather stations that automatically broadcast reliable data and has resulted in higher yields and water saving. Hydro-meteorological measures are made available to local users in real time through the mobile telephone network and the Climaps website. The technology was developed in an R&D project of the Cooperation & Development Centre (CODEV) of the École polytechnique fédérale de Lausanne (EPFL), Switzerland, in partnership with the start-up Sensorscope.
(EPFL, 15/12/2014)

New tools to breed cereal crops that survive flooding

Increasing the tolerance of cereal crops to low oxygen during flooding is a key target for food security. Scientists at the University of Nottingham, UK, have identified the mechanism used by plants under stress conditions to sense low oxygen levels that could lead to the introduction of advanced breeding techniques to developed cereal crops that are better able to tolerate flooding and other waterlogged conditions. They achieved this breakthrough in their work on barley but it could be applied to other cereals. Download the article
(University of Nottingham, 05/02/2015)

AfricaFertilizer.org's expanded website tackles fertilizer market information needs to improve Africa's food security

The newly expanded www.africafertilizer.org website gives farmers access to the best market information available and could provide a key to unlocking a green revolution in Africa. The new website is a powerful tool with many searchable statistics, media channels, market news, product catalogues and business directories, and provides the technical tools farmers and policymakers need to fuel Africa's agricultural development. Designed in an easy-to-navigate, user-friendly format, the website connects fertilizer usage information across the continent and globally, and provides a rich collection of information on Africa's fertilizer market to support rigorous data analysis.
(IFDC, 10/02/2015)

Assessment of genetic diversity of sweet potato in Puerto Rico

The history of the domestication and dispersal of sweet potato (*Ipomoea batatas L.*) in the Caribbean and the high levels of genetic diversity found makes sweet potato an invaluable resource that needs to be protected and further studied. A high level of genetic diversity of sweet potato exists in Puerto Rico, which can be related to its genetic makeup, human intervention and the out-crossing nature of the plant. The study was conducted by Lorraine Rodriguez-Bonilla of Department of Biology, University of Puerto Rico Mayaguez.
(*PLOS ONE*, 31/12/2014)

Rice University study examines how nanoparticles behave in the food chain

This comprehensive laboratory study, one of the first to examine how nanoparticles move through human-relevant food chains, found that nanoparticle accumulation in both plants and animals varies significantly depending on the type of surface coating applied to the particles. Scientists at Rice University, Houston, USA, traced the uptake and accumulation of quantum dot nanoparticles from water to plant roots, leaves and leaf-eating caterpillars. The study, published in the American Chemical Society's journal *Environmental Science & Technology*, is available here.
(Eurekalert, 16/12/2014)

Agriculture, nutrition and health in global development: typology and metrics for integrated interventions and research

There is scant empirical evidence of potential synergies between agriculture, nutrition and health, or about the mix of actions that best supports all three. This paper proposes a typology of interventions and a metric of integration among them to help researchers build on each other's results, to inform the design of multi-sector interventions. The typology recognizes the importance of regional effect modifiers that are not themselves subject to randomized assignment, and trade-offs in how policies and programmes are implemented, evaluated and scaled. Using this typology could facilitate methodological pluralism, helping researchers in one field use knowledge generated elsewhere, each using the most appropriate method for their situation.
(*Annals of the New York Academy of Sciences*, 26/02/2014)

Agrobiodiversity conservation and plant improvement: Adjustments in intellectual property rights reclaiming the public domain towards sustainability and equity

Fulya Batur explains that critics of TRIPS have not achieved the regulatory shift they were advocating due to the lack of socio-technological contextualization of applicable laws and judicial interpretation. Intellectual property applies to very different innovation contexts and confronts all those involved in plant improvement, from mass selectors, small-scale private conventional plant breeders, public molecular researchers, specialized start-ups and integrated biotechnology giants. In her PhD dissertation, Batur notes that with the advent of the TRIPS Agreement and the dominant interpretative implementation of its minimum standards, actors who use, conserve and improve agricultural biodiversity are faced with a strong property rights system that had been thoroughly criticised. However, Batur's research, highlights the lack of progress in changing the regulatory framework and proposes the reasons
(APBREBES, 04/2014)

Ensuring the sustainable availability of affordable quality seeds and planting materials in Uganda: A review of Uganda's draft national seed policy

Uganda's draft national seed policy (e.g. the Seeds and Plant Act 2006) contains serious loopholes, gaps and challenges, primarily due to the lack of relevant regulations and guidelines to ensure its effective implementation. This is the conclusion of a study by Ronald Naluwairo and Julian Barungi of Advocates Coalition for Development and Environment (ACODE), Uganda, who examined the potential of the draft national seed policy, major seed legislation and the key public sector seed establishments to ensure the sustainable availability and accessibility of affordable quality seed and planting materials. The report presents recommendations that, if effectively implemented, could improve the implementation of the national seed policy and seed legislation and would enhance Uganda's seed infrastructure and public funding arrangements. (Advocates Coalition for Development and Environment (ACODE), 2014)

EVENTS

8th GCHERA World Conference Universities' Global Challenge: nutritional security and environmental sustainability for human health

Dates: 25–26 June 2015

Venue: Faculty of Agricultural and Food Sciences, Holy Spirit University of Kaslik, Lebanon

Second European Climate Change Adaptation conference (ECCA)

Dates: 12–14 May 2015

Venue: Copenhagen, Denmark

CALLS

Call for applications: 2015 Oxford Adaptation Academy

Deadline: 1 April 2015

The Africa Biosciences Challenge Fund – Call for applications 2015

Deadline: 31 March 2015

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