Advisory committee on Science and Technology for Innovation: ICT's transforming agricultural science and innovation: implications for ACP agriculture (16-20 November 2009, Montpellier, France)

A report by Froukje Kruijssen

CTA's advisory committee (AC) on science and technology for innovation operates as a thinktank for ACP Agricultural and Rural Development. The membership comprises high level officials of key national, regional and supra-regional S&T and policy organizations, representative of the 6 ACP regions and the EU and CTA. The advisory committee meets annually to provide guidance for CTA's ST&I work programme. The terms of reference of the AC states that it shall comprise of national organizations, from all 6 sub-regions, sub-regional organizations from Africa, regional organizations, Pan-African organizations, Youth Representatives (4), Gender specialist, EU S&T Organizations and observers. The goals of the meeting are consultation, consensus building and empowerment.

The theme of the 8th AC meeting was "ICT's transforming agricultural science and innovation: implications for ACP agriculture". The meeting comprised of plenary sessions with presentations from the different organisations represented and focussed on the use of ICT's in different contexts and the potential it has for agricultural development. Besides, the participants broke up in working groups to discuss specific issues. To streamline these sessions use was made of software developed by WING in Wageningen. The issue of young professional integration was raised several times. Some presentations referred to it in the context of the development of university curricula and promotion of agricultural education, other made special reference to young agricultural entrepreneurs, the issue of interesting girls and maintaining youth in agriculture was also raised several times.

The author of this report made two presentations:

1. **Youth engagement in agricultural research: A focus on Sub-Sahara Africa** (See: http://portals.wi.wur.nl/E-news/FO60/Youth.pdf). This report, commissioned by Wageningen University and Research Centre, assesses the diminishing interest in agricultural careers of young people. Along with the renewed international attention for agriculture as a driver of economic development in countries in the south, new attention is required for engaging young people in the future of agriculture. The study presented in the report provides an overview of the present situation of youth engagement, and career perspectives, in agricultural research and it examines some of the underlying factors that limit better integration of youth in the sector. The study also assesses current relevant youth initiatives, both within and outside of the strict realm of agriculture, and makes recommendations for possible actions. Special attention is given to Sub-Sahara Africa where agricultural research is considered most essential for economic development. The study identifies four key factors that influence the engagement of youth in agricultural research, especially in Sub-Sahara Africa. These are: (1) Career development of young professionals, (2) Interest of youth in agriculture as a career choice, (3) Quality of educational curricula, infrastructure and teaching methods and (4) Investments in agricultural research.
   During the discussion afterwards questions were raised about how to reach the young entrepreneurs. Keeping people in the agricultural sector is important so how do we link young entrepreneurs to mentoring, technology and funds for their innovative ideas. Also the gender issue was raised again. Getting girls into agriculture still remains an important issue. How can we make sure that women become more involved?

2. **Potential areas of collaboration between YPARD and CTA: mobilizing young professionals for science and innovation**
   Based on YPARD's strategic objectives as described in the business plan, several potential areas of collaboration between YPARD and CTA were suggested:

Activity	Output	Collaboration
Objective 1: Exchange of information and connecting YPs		
1. Website development & maintenance	An up-to-date functioning website with high number of visitors and satisfied members	CTA intern that works on relevant news items, twitter and blog (possibly sharing experiences of being at an international organisation) and other innovative ICT tools
3. Mentoring programme	Functioning mentoring system	Piloting of more innovative mentorship programmes within CTA's internship program. A CTA intern that has designated time for YPARD issues.
Objective 2: Opportunities for policy debate		
4. Develop inter-institutional linkages	X institutional members of YPARD in 2014; YPARD known in ARD policy community	− CTA institutional member − YPARD continues to be part of CTA's S&T meeting
5. Increase the visibility & membership	Increased visibility of YPARD; increased YPARD membership	YPARD taps into CTA's extensive network to reach more young professionals in ACP region
6. Attending ARD events	25 YPs yearly attend strategic ARD events, and have shared their experiences within the YPARD movement	Support for YPARD members to attend meetings
7. Developing mainstreaming guidelines	Guidelines for mainstreaming youth in ARDs are developed and implemented in at least 2 ARD organisations by 2012	CTA contributes to mainstreaming guidelines as front runner
Objective 4: Access to resources and Capacity Building		
9. Facilitate access to capacity building	30 YPs per year participate in relevant CB events, sponsored by YPARD and share their experiences in the YPARD movement; x YPs per year access other CB events	Support for YPARD members to attend events

Some remarks:
- Issue of youth engagement clearly considered relevant by the participants in the meeting
- Many suggested linking up with other student / youth organisations: e.g. AWARD, student councils all over the world)
- Clear linkage also needed with AYFST. How can we bring youth together. Try to organize type of youth forum for agricultural research and innovation.

Some interesting issues from the meeting:
- ICT use → WING in Wageningen are developing innovative software to use to exchange ideas.
- Use of adobe to share desktops and documents long distance: http://share.adobe.com
- Caribbean: competitions exist for science & technology. Capacity building of young professionals in IPR and commercializing their innovative ideas.
- UniBRAIN (FARA): incubator for ideas from young entrepreneurs (see below)
- OECD: strong indications of problem of aging in agricultural research (see below)
- University of Joensuu: to increase use of ICTs in rural areas make sure that solutions are offered that fit the needs of the rural people (see below)

- GCARD 2010: side-event on Challenges and innovation processes for capacity strengthening in ARD (see below)

Below follows a summary of some of the presentations. A cd-rom with all presentations is available.

Day 1 – Mega trends

Hansjörg Neun – CTA

There is much talk about increasing investments in agricultural research, however is it really happening? Analysis of how agriculture contributes to development needs to get to all institutions and we should give policy makers the correct figures. Infrastructure should include ICT however, is often a forgotten budget line. All institutes need a communication strategy to be able to speak to journalists and policy makers.

Judith Ann Francis – CTA

An e-consultation was held among participants of the AC meeting. A summary report is available. Some key points:

- Participation: 1st round 64%, 2nd round 81%
- Major technological challenges for ACP: coping with adverse effects of climate change, bio- and nanotechnology, ICT systems for ARD, green agricultural innovations, trade
- Most important global megatrends: climate change, increasing water shortages, growing food insecurity
- Most important positive megatrends in ACP countries: growing consensus about efforts to address climate change and ARD issues, policy support for ARD and education, spread of ICTs and its applications
- Most important megatrends in ACP countries: climate change, low priority of ARD on the political agenda, food insecurity
- Wide range of key interventions to be undertaken by ACP governments aiming at boosting agricultural output, increasing priority to ARD, strengthening ARD and building capacity of growers and processors
- Key scientific disciplines: biotechnology and genetic engineering, ICTs, natural resources, post-harvest technologies, innovation systems, economics/sociology/political studies, soil sciences
- ICT applications likely to shape the agenda: mobile phones in combination with internet, bandwith, radio and internet, internet and online databases, satellite GIS and GPS, laboratory technologies
- Main investments in ICT for: communication and collaborative networking, online databases, more bandwith, broadcasting information
- Most important food commodities: grains, fruits, vegetables, livestock poultry and dairy, cassava roots and tuber crops
- Most important non-food commodities: medicinal plants, essential oils and gums, flowers, coffee tea and cocoa, biofuel crops, cotton and other fibres

Kees van Diepen – Wageningen University

Key questions: how many people can the world feed? How much land is available for agricultural production worldwide? What is the technical production potential from this land?

The world population may go up from 6.5 billion now to 9 billion in 2050. Demand for food will increase, demand for animal products may double. Plant production must be doubled to feed the world in 2050. According to world food studies the world can feed 8-14 billion inhabitants. Agro-production systems are a function of inputs and outputs. In less-favoured areas the input-output ratio is much more unfavourable. The ultimate aim is to go from a situation with low external input and low output to one with low external input and high output. We definitely want to avoid the situation of high external input and low output. To increase yields, higher complexity in agro-production systems will be required. Theoretical global potential is enough to feed 47 billion people. However not taken into account: resource degradation due to climate change and soil degradation. Additional downscaled theoretical scenarios lead to plausible future scenarios with food for 10-14 billion people.

Mary Louise Kearney – OECD

The future of higher education and research in the knowledge society. HERI systems: Higher education research, innovation. Issues for knowledge systems:

- Globalization, but digital divide and people that do not have access are increasingly disadvantaged.

- Massification: almost everyone in developed world goes on to post-secondary education.
- Gender aspect: in many places women are now outnumbering men, which brings its own problems.
- Modern Academy: managerial culture in higher education is here to stay. With financial crisis there is a huge demand for re-training which increases pressure on higher education. Changing professoriate (less tenure more contracting). Internationalization of research with IT. Social engagement of institutions to development has become increasingly important (as marketing tool), so working in partnerships with business community, social community to look at how local and bigger problems can be resolved.
- Rising demand for higher education
- Crisis for academia: pensions of baby boomers. UK: 19.000 academics needed by 2020. Opportunity from non OECD countries. Netherlands etc. 40% in academia 55+.
- In Shanghai rankings of top 50 research universities ranks 37 institutions from US, 5 from UK, non from continental Europe… But there is a need for different measurement tools that also take into consideration social engagement.
- It is important to inspire students to engage in lifelong academic development.
- Three factors needed for higher research: talented people, favorable governance that permits intellectual activity, resources.
- Attention for: why would you do a PhD and what are your job perspectives after it.
- Brain drain remains a large problem in Africa.
- To address digital divide IT companies have to participate! The major companies are sensitive to this and do research to see how this divide can be addressed.
- Beyond numbers about investment and staff it is important to look at other circumstances such as political environment etc.

Discussion

- More production needs more external inputs, so this will also increase the costs. Is it possible to increase productivity without increasing costs?
- Need for partnership. Best practices to be brought to Africa. Leadership is critical.
- DEMOS (UK) edgeless university study: aspects of IT that have not really been researched in terms of its potential.

Towela Nyirenda-Jere – NEPAD

Access to internet in Africa is low because of low availability of broad band and internet access points. Fixed telephone lines are needed for higher broadband penetration in Africa. NEPAD is working on this issue through several projects:

1. Broadband infrastructure: need to link coastal countries to the submarine cables and then terrestrial cables to link other countries.
2. E-schools initiative (use of ICT in education both by students and teachers).
3. E-payment gateway, payment platform that provides access to e-commerce. Cables being installed, benefits already felt on southeast coast but West Africa only late 2011 or 2012 and also challenge to reach landlocked countries. Satellites being built and launched.

Google is planning to launch 16 satellites to reach users in Asia, Africa and Latin America that have no access presently. Penetration of both traditional and modern ICT's are very low in Africa compared to the rest of the world. Telephones are being used: teleconferences for farmers and extension, able to work in own language. Cellphones: Nokia Life Tools (info on inputs, markets etc.), Nokia telephone with battery life of 22 days, flashlight, radio, agric package. Radio: one radio can service many users (so pervasive), farm radio to exchange commodities, community radio stations. Electronic transactions: MAKWACHA cards, withdraw cash or buy farm inputs and household supplies with their cards (collaboration with agric company and banks), M-PESA. Portable media: computer lab in wheels from Intel. Integrated approaches with radio & mobile etc. Satellite and GIS: mapping markets and food availability, agriculture and water resources etc. Sensor networks: data on plants, weather, soil etc collecting data important for agriculture through wireless sending of info. We should not forget the old technologies with the use of new ones. Local content needed so that relevance can be seen.

Key issues: Where should investment in ICT be focused? Who is responsibility for ICT development? Where can we get most benefits?

Day 2 - Opportunities, case studies

Oumy Ndiaye – CTA

CTA communication strategy: collect, provide, share information. There is a mobile revolution in Africa, but broadband should not be forgotten. New players: rural tele-centres. Issues: awareness raising, relevancy and meaningful use, ICT4D works best when they connect people where they are otherwise struggling to do so. Sustainability, proper timelines and planning. Promote collection of relevant material for ACP including grey literature, promote use of mobile devices to facilitate data exchange and sharing, contribute to reducing digital divide resulting from gender issues. Maintain human development perspective, integrate use of old and new technologies.

Zelalem Mengistu – PhD Student, Dept. of Information Systems & Technology, Strayer University, USA

Tele-medicine. Diagnosing a patient remotely. Farmers often have no access to medical care. More timely diagnosis and treatment. www.inveneo.org

Sylvia Gaiani – Research Fellow, University of Joensuu, Finland

Opportunities, priorities, and possible investment for ICT. Localization of solutions that fit the needs of the rural people (e.g. create voicebook instead of 'dumping' facebook). Profit for the poor (grameen): seizing mobile market for benefit of the poor. Sustainability comes first, so never forget the relationship between ICT, trust and local culture. If people do not trust ICT they will not use it.

Discussion

- Feasibility of tele-medicine in Africa? In terms of costs (it is relative), skills and connectivity (getting better)? In Senegal there is a system of tele-medicine. It works well. Use tele-medicine for malnutrition (boosting a partnership so it is a platform to communicate with doctors)
- Challenges that rural areas are facing are more or less the same everywhere. The main challenge is to make rural areas attractive for the young generation.

Dominique This – SupAgro

Lessons from north-south university course using ICT. Need for better performing plant varieties to feed the growing world population. Data on genomes of useful crops are publicly available. Data is useful to associate the diversity present with certain desirable agronomic traits. Genetic markers should be helpful to accelerate varietal selection. This knowledge, easily available for free should aid plant breeders in all parts of the world. Collaboration developed between UCAD (Senegal) and Montpellier SupAgro because of shared interest in suing new teaching methodologies (distance learning). Test for West Africa of the 'Moodle' tool. Specific activities: forum and quiz, chat, case studies (group), scientific controversy. Lessons: great enthusiasm of students and teachers for distance learning, importance of tutoring, difficulties with internet connections.

Day 3 - Investments

Julius Okojie – National Universities Commission, Nigera

Many of the university staff do not have a PhD degree. This raises the problem that many students have other reasons for applying for agricultural subjects. Poor innovation system (how to promote innovation?) He presented the Nigerian case of how to deal with these issues.

Aissetou Drame Yaye – ANAFE

ANAFE is a member network. ANAFE links education with research extension and development. Teachers and students use ICT almost in the same way.

Adipala Ekwamu – RUFORUM

PhD scholarships do not support the families of the students which often means that women with families are unable to accept a scholarship offered to them. Universities should be key players in innovation in agricultural research. RUFORUM links the programs to the efforts of NEPAD. Strategies: strengthen human resources capacity development. Malawi University asked to take leadership to train other universities (good practice). Nurturing capacity of weak universities through partnerships. Staff/ student exchange. Research support through grants that are linked to graduate training. Mentoring & internships. Increase participation of women in education is very important. Employment in civil society important but they are unable to absorb all the graduates so need to look at other employment. How to incorporate what the market demands of graduates?

Day 4 - Science & technology program – moving forward

Judith Francis: CTA and S&T 2010 – 2012

- Objective: support ACP region in their effort for enhanced agricultural performance, sustainable rural development and economic growth.
- Purpose: empowering S&T community
- Way of working: through partnerships, also including youth
- Focus: women and young professionals in science, agricultural research, tertiary education, innovation systems approach, foresighting. Evidence-based decision making support for increasing investments in ST&I.
- Women and young professionals in science competition: training, awards.
- ASTI workshops organized
- Strengthen the role of science in agricultural innovation

FARA: UniBRAIN

FARA is interested in setting up of innovation-hubs for young entrepreneurs where they can be mentored and helped to access financial resources. Proposal: UniBRAIN

- Realizing the potential of Africa's youth, linking university education, research and business in sustainable agriculture through University, Business and Research in Agricultural Innovation (UniBRAIN)
- Africa has plenty of opportunities, plentiful sources of potentially skilled workers but a new approach is needed that will produce agricultural entrepreneurs
- UniBRAIN is aimed at fostering agricultural innovation by establishing better linkages, to address constraints and support innovations and facilitate start-ups
- Provide holistic supporting measures including assistance, financial support and mentoring, strengthening capacity for upscaling, building knowledge in promoting agricultural innovation
- The strength of UniBRAIN is that youth get access to experience in establishing agri-innovation camps, changing curricula, hands-on experience in innovation
- For now limited countries eligible: Benin, Burkina Faso, Mali, Kenya, Uganda, Tanzania, Mozambique and Zambia
- ANAFE will provide matchmaking, Pan AAC will facilitate agribusiness aspects, Sub-regional organizations will facilitate agricultural research subjects, ATPS (Africa Technology Policies Studies networks) will facilitate aspects of governance and management, FARA will facilitate the entire program
- DANIDA funded (results on funding proposal on 10th of December)

Didier Pillot – GCARD 2010

GCARD 2010 involves three major innovations: Discussions shouldn't be set-up by centre but through the mega-programs. Changes of ways of thinking from a linear world view to a networked world view, from thinking for to thinking with, from developing technologies to technologies plus. Topics are about research but not by IRO's alone but also including many other stakeholders

- Structure: day 1, ARD thematic priorities; day 2, regional day + feedback side events; day 3, tools and changes necessary to make AR systems more effective (system organization and governance), day 4, action plans for strengthening ARD.
- Side event: Challenges and innovation processes for capacity strengthening in ARD (26-27 March 2010). Joint and collaborative postgraduate training, enhancing relevance of postgraduate and postdoctoral training in

North-South collaboration, the role of HEI in lifelong training of ARD professionals, multi-stakeholder platforms, using the potential of ICTs for education, ACP/ Europe young researchers thematic networks to build critical masses of PhD students on the same topic. Register on the GFAR website for the GCARD.