Changing Landscape of EU International Cooperation in Research and Innovation: What are the opportunities if ACP countries invest in their own ARD capabilities?

Cornelia E Nauen

Mundus maris – Sciences and Arts for Sustainability asbl, Brussels, Belgium.

All change starts with local knowledge

Sustainable improvement of human well-being depends crucially on knowledge, its production, organisation, distribution, appropriation and wise use. Access to information, the capacity to generate and use scientific and technological knowledge and human innovation give institutions and countries an edge. For ACP countries, past development efforts that ignored local circumstances, technologies and systems of knowledge wasted enormous amounts of time and resources and have failed to achieve the desired result: *"sustainable development"*.

We are witnessing an almost incredible diversification and acceleration of knowledge production via expanded scientific and technological applications. This changes what is perceived as worth knowing and transmitting between generations, through formal school channels and intergenerational learning in families, from peers and other sources. At the same time, we risk losing some local knowledge and well-tested experiences e.g. that which is codified in indigenous knowledge systems when technological discontinuity makes it socially and sometimes practically less desirable. How can we ground decisions on the most up-to-date combination of sources? Are there examples from global collaborative projects? (See Box 1)

Box 1 – FishBase, the global web repository about fish biodiversity

Born out of an All-ACP project in the 1990s, FishBase became the global repository about everything you want to know about fish – in all aquatic environments, fresh and brackish water and marine, initially covering about 20,000 species of fish. The knowledge was primarily in the minds of a few specialists or books in scientific libraries. With the structuring of centuries of research results in a public archive on the internet, a huge body of knowledge became accessible to computer and mobile internet users. Local fish names are collected in as many languages as possible and connected to scientific names so as to bridge scientifically validated knowledge and largely disconnected bodies of knowledge held by fishing communities, aquarium hobbyists, recreational fishers, divers and others with an interest in fish and aquatic environments. With about one million users, FishBase is maintained and further developed by an international consortium and has more than 2000 voluntary collaborators from around the world. www.fishbase.org

Sustainable futures

Compared with many modern technologies, traditional techniques have been tried and tested: they are effective, inexpensive, locally available and socially/culturally appropriate. This knowledge resides in the minds and practices of farmers around the globe, in their selection of a huge variety of seeds of usable plants adapted to all ecological niches, production and consumption conditions. Concerns over food security have boosted intensification techniques in agriculture, including

increased investments in modern biotechnology.

More than 3,000 plant species are used as sources of food. Major international efforts in genetics and biotechnology were directed at improvements for producing higher-yielding and disease resistant varieties as well as increasing productivity per hectare of a few key crops, such as rice, maize and wheat – staple cereals for very large human populations. Other commodities e.g. potato, millet, sorghum, cassava, beans, livestock and fish have not received similar focus. Efforts were also directed at studying entire farming systems and how to ensure soil fertility, pest and disease control, product quality for different processing and market needs and more. However, as public extension services in developing countries (including ACP) shrank under economic reform programmes in the 1980s, such as structural adjustment, the links between research and producers weakened and their innovation capacity declined.

The private sector-led industrial models of agriculture tend to require large capital inputs and work best with farmer/investors who can buy into the technical knowledge, the hybrid seeds with their requirements of fertiliser and pest control and, most importantly, with producers, who are well connected to large urban markets, whether locally or internationally. Similar trends can be discerned in livestock, dairy and fish and seafood production.

Farmers of the future

Preliminary research results about reassessing world-wide fisheries production query the reliability of some models that have influenced the way fisheries are portrayed through global statistics. Most countries under-report the catches of their small-scale fisheries as well as discards from different fisheries significantly, giving a substantial underestimation of overall extraction (see Box 2).

Box 2 – Traditional small-scale producers are too big to be ignored

Global statistics about fisheries production are compiled by the UN's Food and Agriculture Organization (FAO) from national data and estimates communicated by FAO member countries. The multiyear Sea Around Us Project (http://www.seaaroundus.org) involves detailed catch reconstructions, and tests the veracity of these official statistics. Partial results suggest major underestimation, particularly of artisanal catches (Harper and Zeller, 2009, 2011). These fisheries are particularly important for local food security. They produce for subsistence, but also increasingly for markets, occasionally even for international ones. Estimates of significant discards and unwanted bycatch, particularly in industrial fisheries, lead to further corrections of effective extraction. The spectre of illegal, unreported and unregulated (IUU) fishing and widespread mislabelling of products undermines the ability to deliver realistic assessments for decision-making.

Much production on the land by subsistence farmers (often women) is underrepresented, in official statistics. Most research, government attention and support go to technological (and technocratic) approaches towards large-scale production: the opposite end of the continuum. Small and medium farms, specialty or niche production, peri-urban agriculture fit somewhere in between.

The farmer of the future will depend on what type of food the consumers and markets (many dominated by multinational companies) demand. Until about 2010, market competition had driven one-half of the farms in industrialised countries out of business. Sometimes the average farm increased in size, but often land was abandoned as not economically viable. What type of farmers

do ACP and EU countries want in the future? This goes well beyond a narrow sectoral perspective or technical improvement.

In the EU case, the 1992 agricultural reforms are largely unimplemented by Member States, although both legislation and policies (i.e. agri-environmental legislation and measures (subsidies…) are in place at European level. The EU has "multi-purpose policies" targeting environment, landscape functions and more, but EU agriculture is mostly not "competitive" without subsidies. So, either agriculture became competitive through the development of new (multi-purpose) knowledge, compatible with the World Trade Organization (WTO) system, or EU countries reduced or even stopped farming and imported "cheap" food and commodities from abroad. For various reasons, the second option prevailed. The issue of biofuels and the subsequent rise of food prices, has forced major producers to use every square metre of land to produce commodities. Yet, today's prices are twice those of 2004! This obviously impacts food security and "access to food", especially for the poor.

Sustainable intensification

Global food production could feed the human population, even considering that poor agricultural practices in some places and urban sprawl, among others, lead to shrinking arable lands and that climate change is capping productivity gains made earlier through biotechnology. However, we waste an estimated 40% of food in industrialised countries, while combined factors, primarily cost, make access to sufficient food of appropriate quality a challenge for poor people, in ACP countries, the EU and other middle- and upper-income countries.

A more sustainable system would (1) meet the needs of the poor by focussing on more equitable distribution, not necessarily growth as such, and (2) operate within the limits of what science, technology and other knowledge systems help us achieve within the world’s ecosystems and social systems. It is worth looking at the different knowledge systems underpinning these production and consumption modes. The knowledge required to operate along this production continuum varies vastly and extends into adequate social organisation, handling, processing, marketing and other management aspects. It should be explicitly blended with understanding of agro-systems management, energy efficiency and sustainable energy choices and knowledge about nutrition, health and public health. This helps to prioritise efforts in terms of the two current key challenges for sustainability.

It would be unwise to want to copy uncritically an agro-system from somewhere else, a particular model of production or be confined to a narrow spectrum of monopolistic commodities at the expense of the richer mix of models and products. Harnessing diversity, diversification, complementarity and preferences of food crops over fuel crops are development and risk-management strategies that make both national and regional systems more robust and fit for enhancing outcomes in human well-being, especially when supported by critically engaged and multi-faceted research building on existing local knowledge. Affordability and social acceptance should be concerns inspiring the research questions and agenda.

Policies must reconcile social, economic and environmental requirements for both sustainable improvements of livelihoods and viable farms and sustainable consumption. Questions are raised as to how intensification can be achieved with less fossil energy consumption and maintaining carbon

sink functions, and less pesticides and other synthetic molecules, given their adverse health effects on farm workers and their global appearance even in remote ecosystems on the land and in the sea and thus in humans consuming food from such ecosystems.

Agricultural, energy and rural policies must cover food security, sustainable intensification and diversification away from one or two dominant cash crops, finding affordable solutions for local circumstances, such as specific tenure systems and ecological conditions including more frequent drought and flooding, ensuring broader rural development and productivity enhancements. These are all multi-purpose challenges between economically viable production, nature conservation or rehabilitation including maintenance of agricultural biodiversity, and food security and social needs, including those of female-headed and other vulnerable households. Preserved, if not enhanced, soil fertility together with management of water and other natural resources and entire ecosystems for restoration and long-term conservation are being recognised increasingly as foundations of successful agro-food systems. The presence of enabling policies and setting and enforcing rules will play a major role. Increased public health, maternal, infant and labour healthcare are as much enabling factors as generalised and expanded school education at all levels.

Informing the research questions and collaborative mechanisms

Agro-food systems including crops, livestock, capture and culture fisheries are embedded in marine, freshwater and terrestrial ecosystems and their biodiversity, which need study and careful attention. The human institutions that developed around these commons have ensured distributional justice and maintained a reservoir of resources from which exploited and cultivated species are drawn and renewed. The commons have been historically where resource-poor people could gather food, fibre and energy (e.g. fuel wood). Private land appropriation puts increasing pressure on these often invisible ecological and social safety nets. To live well with limited resources, the global natural resource commons and the social institutions upholding them deserve much more research and policy attention to avoid trapping ourselves in Hardin (1968)'s tragedy, which is less generalised than the original paper suggests.

The modern revival of protected areas and national parks follows earlier practices of self-restraint, often based on religious beliefs and taboos. For these to become a major insurance for sustaining ecosystems under siege, it will require stronger concomitant consideration of environmental, social and economic forces and build-up of locally grounded institutions sustaining them. Environmental issues, in particular water, clean air, climate and pollution have made some progress, but are still often considered dependable and get regularly 'sacrificed' for short-term social imperatives, not to mention economic gains. Migration from resource-depleted or otherwise affected places to still healthy and productive ones was once possible. With human populations occupying and affecting even remote corners of the planet, science, technology and innovation are now crucial, building on local traditional knowledge, where it exists.

Incorporating the wealth of existing local and indigenous knowledge significantly enhances the ability to innovatively adapt to changing circumstances. Information and knowledge available in one place may not be recognised and used elsewhere. Framing research and its results in relation to local knowledge and conditions involves mindset change more than technical ability. Local research agendas give better results (See Box 3) and international cooperation is more productive as well. The interdependent challenges and opportunities make international cooperation in research and

innovation particularly useful, even indispensable, as even large countries have limited resources.

Box 3 – More competition and engaging research with research users in Senegal

To address the increased need for research and to overcome fragmentation between major organisations, The Senegalese Ministry set up a National Fund for Agricultural and Agro-Food Research (http://www.fnraa.sn/), offering competitive funding with emphasis on raising agricultural productivity, building bridges between high-quality research, research users, the public authorities and international development partners. A civil society representative actively participates in the proposal review process alongside science evaluators, independently of ministry review.

International research cooperation and collective knowledge

The ACP-EU cooperation in research and innovation has been developed beyond participation in the generally open European Research Framework Programmes. INCO-Nets by region or sub-region serve to support STI policy dialogue, agenda setting and capacity building so as to strengthen the framework for concrete research cooperation in multiple configurations. INCO-Nets operate for Sub-Saharan Africa, the Caribbean and the Pacific, some in their second cycle:

- The first CAAST-Net (http://www.caast-net.org/) finished in December 2012. The sequel with some new partners is CAAST-Net Plus (http://www.caast-net-plus.org/), (2013- 2016.
- EUCARINET (http://www.eucarinet.eu) brings together five European and six Caribbean partners.
- PACE-Net (http://www.pacenet.eu) was a three-year coordination action supporting dialogue with the Pacific region, to be followed by PACE-Net Plus.

ERA-Nets with international participation serve as platforms for research programme owners to foster cooperation on a mutually agreed agenda of priorities. ERAFRICA (http://www.erafrica.eu) enabled both sides to engage strongly in agenda setting and consequently mobilised research teams, financial resources and follow-up. ERA-Nets with less ACP participation are less able to engage funding agencies. A case in point may be ERA ARD I and II (http://www.era-ard.org/). Ownership is long recognised by development cooperation practitioners as fundamental to progress resonating with local knowledge and grounding, even when bigger international and even global issues are at stake. Incomplete engagement with African partners may have caused somewhat mixed results, when the smaller-scale explorations on the research side were set to be amplified by the robust funding out of development cooperation instruments.

The Platform for African-European Partnership on Agricultural Research for Development (PAEPARD) http://paepard.org/wakka.php?wiki=HomePage states great objectives and a sensitivity to facilitate collaboration between farmers' organisations, civil society organisations, research institutes, education establishments, private companies and policy networks, but had difficulty getting 'buy-in' from such potential partners. They mobilised €7 million in the first project edition (€5.5 million from the EU), while project partners made only modest financial contributions. Thus 'satellite platforms' to address specific domains of scientific and socio-economic importance and achieve more uptake among partner institutions and civil society organisations appear still elusive. It seems difficult to develop the necessary trust and practice to gel experiences

from very different circumstances into more integrated collective knowledge and action.

Box 4 – ERAFRICA – successful joint research funding between African and European agencies

The ERAfrica ERANET is the first initiative of European and African countries to jointly fund collaborative research projects in the framework of the FP7 International Cooperation. ERAfrica was set up to facilitate networking of African and European funders of research and innovation and to work towards joint project calls. The agreement concerns ministries and public institutions from 15 countries (10 European and 5 African): Austria, Belgium, Burkina Faso, Ivory Coast, Egypt, Finland, France, Germany, Kenya, the Netherlands, Norway, Portugal, South Africa, Switzerland and Turkey. The Calls and procedures for evaluation and allocation of funds have been developed by the €2 million, three-year "ERA-Net for Africa" (ERAfrica) project, which ran from 01/12/2010 to 30/11/2012. Key factors in raising substantial financial resources from African and European research funders were joint ownership of African and European agencies, their efforts to respond to real needs in society, mutual learning, complementing bilateral cooperation and a liberty of operation, which fostered high-quality management and innovation. The funding agencies raised more than €10 million for their first call, with 801 participants in 122 proposals and a 6:1 over-subscription, now being independent evaluated for funding.

Some provisional conclusions on changing landscapes

The landscape of research and scientific cooperation is certainly changing. While universities, research establishments and others see the need for cooperating and associating with the best in their fields and attracting young researchers from anywhere, recent policy emphasis on unspecified and broad-based competitiveness, may counter-intuitively lead to less cooperation, at least at regional level. Yet, an ability to cooperate is part of the 'competitiveness' countries use to develop solutions to the societal challenges surpassing their own means.

At the European level, one notes somewhat less commitment of several Member States to engage with international cooperation, despite maintaining or even stepping up efforts for international cooperation, but from a national platform. The rise of research and innovation in more countries diversifies the international landscape and creates new opportunities for ACP countries investing in their ARD capabilities and valuing their home-grown knowledge embedded in indigenous knowledge systems. Making public research results freely available is a positive development, reducing transaction cost, hastening progress in understanding and ensuring more use by companies and other stakeholders.

The European Commission (2012a) Communication “Towards better access to scientific information: Boosting the benefits of public investment in research” demonstrates this. The European Commission (2012b) action plan for the G8 Conference on Open Data for Agriculture specifies several concrete activities, including research projects. ACP countries and institutions will benefit from active participation as better information flows – from data to developing narratives that explain the implications of research results for policy makers and others. Doing more research in agro-food and connected areas important for sustainable human well-being and doing so in critically engaged ways with stakeholders will connect research to ground realities and facilitate uptake, from farmers to policy makers.

Acknowledgement

The critical reading, substantial comments and suggestions of Gerasimos Apostolatos of the European Commission's International Cooperation Programme (INCO) in Research and Innovation are gratefully acknowledged. He also contributed the visual presentation of data on the participation of research teams from ACP countries and countries in other regions and a specific explanatory note about features and success factors of the ERAfrica cooperation of African and European research funding agencies.

References

European Commission. 2012a. Communication from the commission to the European Parliament, the Council, the European economic and social Committee and The Committee Of The Regions. Towards better access to scientific information: Boosting the benefits of public investments in research. http://ec.europa.eu/research/science-society/document_library/pdf_06/era-communication-towards-better-access-to-scientific-information_en.pdf (accessed 27 July 2013).

European Commission. 2012b. European Commission Action Plan: G-8 International Conference on Open Data for Agriculture. https://docs.google.com/file/d/0B4aXVC8hUc3oZlVEdlZ1RVJvZms/edit?pli=1 (accessed 27 July 2013).

Hardin, G. 1968. The Tragedy of the Commons. *Science* 162 No. 3859, 1243-1248.

Harper, S., Zeller, D. Eds. 2009. Fisheries catch reconstructions: Islands, Part I. University of British Columbia. *Fisheries Centre Research Reports* 17, 5. http://hdl.handle.net/2429/41025 (accessed 27 July 2013).

Harper, S., Zeller, D. Eds. 2011. Fisheries Catch Reconstructions: Islands, Part II. University of British Columbia. *Fisheries Centre Research Reports* 19, 4. http://www.fisheries.ubc.ca/webfm_send/114. (accessed 27 July 2013).