PERSPECTIVES ON SWEDISH DEVELOPMENT RESEARCH

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# currents

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Johan Toborn As many perspectives on Swedish development research as there are interpretations of the cover photo? Other photos: Johan Toborn, unless stated otherwise

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# **EDITORIAL**

**S** wedish support of research capacity building in developing countries has long been lauded as visionary and tenacious. Support to research has gained importance in Swedish development cooperation. With minor exceptions development research using Swedish sources is funded by SAREC, Sida's department for research cooperation. This is not by default but, since the establishment of SAREC, other Swedish research councils have in practice withdrawn their funding. In recent years, a SAREC-Formas cooperation has provided some promising openings for increased cooperation with the Consultative Group on International Agricultural Research (CGIAR). However, it is since long debated, with fuel added by the endorsement of the Swedish Policy for Global Development, whether other research councils should not fund research of global importance.

This issue of Currents looks at the three major legs of support to research as part of Swedish development cooperation. In simple terms, bilateral support builds research capacity in developing countries. Support to thematic research contributes to generation of new knowledge, and is often given as core funding to competent international and regional organizations. Support to Swedish development research encourages and maintains competence among Swedish researchers. In the absence of a better term we refer to the above programmes collectively as Swedish development research.

In 2006, a series of evaluations reviewed these programmes. Separate studies were also made of bilateral projects at selected universities to develop ICT capacity and introduce research funds respectively, and of SAREC's organisation. Together these studies provide an ample documentation of what SAREC does – and how it does it. The evaluations are, on the whole, positive, and some of the critical points made can be traced back to SAREC's capacity to manage its programmes. SAREC, like Sida as a whole, is under political pressure to keep down administration and management costs. Summaries of the evaluations are a recurrent theme throughout this issue.

Swedish universities depend on SAREC-Sida contributions to engage in development research. Two articles discuss and analyse how this shapes the profile of research, and the associated advantages and disadvantages. Research questions in rural and agricultural development tend to become increasingly complicated, and our research competence in these fields would contribute to, and benefit from, being included in larger, thematic research programmes. Gaining access to such programmes is more complicated and uncertain, and requires coherent efforts to be successful. This is the second recurrent theme. The third theme brings to the fore some issues raised in the evaluations or in the current discourse on development research. Some of these issues are touched in short articles.

It can be discussed whether development research is the proper term to use in this context, and what it means. Such research should be of high scientific quality but is, however, also expected to bring about much needed change. Change may be direct or very indirect depending on subject, type of research, etc. Tracing and measuring impact is becoming a science in itself. It is also argued that demand-driven research stands better chances of having an impact. This statement needs qualification. Demand-driven approaches have their drawbacks, and special obstacles to institutionalise.

The situation in Africa is attracting constant attention. Increased research capacity is suggested as one measure to turn the tide. We illustrate Africa's knowledge gap in general and with special attention to agriculture, reflect on national agricultural research system reform, and the dominant role played by agricultural research organisations.

Research communication, contrasted to research information, is gradually being recognised as an essential, but hitherto neglected, aspect for research uptake and relevance. Lessons are being learnt on how to develop and implement better communication strategies. Obviously, research financiers are part of this process and will be instrumental in upgrading this function.

Innovation systems' thinking is in vogue. One article describes why and how a major DFID agricultural research programme has remodelled the research activities to fit an innovation system perspective. Another article demonstrates how innovation and innovation systems thinking is becoming common, and may represent the latest complementary stage of the move from the classical linear research to development model.

There are many possible perspectives on Swedish development research. We covered three, remain convinced that development research is extremely important, but it has to be freely discussed and analysed from many different angles to deal with current and future development challenges.

in den

Lisa Sennerby Forsse Editor-in-Chief

## The Department for Research Cooperation (SAREC) – Lessons learned

Sweden has been a supporter of research on-, and research cooperation with, developing countries since 1975. Its support to international and regional thematic research programmes has a reputation of being long-term and unrestricted. From the onset, the bilateral support has emphasised university capacity building over extended periods.

Support to Swedish development research may be the best-known part of SAREC's activities and has, in practice, been the sole domestic funding source open to Swedish development researchers. Overall, however, few have a complete comprehension of SAREC's programmes and what they aspire and accomplish.

A series of evaluations (see list in the box below) have been commissioned to look at SAREC. What can be learnt, what can be improved? The evaluations are generally positive but there are question marks; some pertaining to SAREC, some rather relating to more general issues on how best to make research a factor in development.

### SAREC's goals

"Sida has been tasked by the Swedish Government to strengthen the research capacity of developing countries, promote research that contributes to poverty reduction, and to fair and sustainable global development. In addition, Sida must contribute to strengthening research in Sweden that is relevant to development. The goal for Sida's research cooperation according to Sida's annual directives and letter of appropriations is that future support will be provided:

• for poor developing countries in order to build up good quality research environments, to train researchers and to develop methods for planning, prioritisation and financing of research;

• in the form of financial and scientific resources aimed at supporting the production of new knowledge and the promotion of utilisation of research results that are of importance to development;

• to promote scientific cooperation between researchers in Sweden and in developing countries, as well as participation of Swedish researchers in development research and research cooperation" (Eduards, p11). SAREC, being a part of Sida, also has to 'create conditions and support processes that lead to poverty reduction in partner countries' (Sida objective) and 'contribute to make it possible for poor people to improve the quality of their lives' (Swedish development cooperation objective).

Staff writer

### **Evaluations**

- Boeren, A. et al, 2006. Sida/SAREC Bilateral Research Cooperation: Lessons Learned. Sida Evaluation 06/17. Sida, Department for Evaluation and Internal Audit, Stockholm.
- Deiaco, E., Högberg, A. and Svensson, B., 2006. SAREC:s stöd till svensk u-landsforskning. Sida Evaluation 06/27. Sida, Sekretariatet för utvärdering och intern revision, Stockholm.
- Edqvist, O., 2006. Sidas U-landsforskningsråd. Sida Evaluation 06/24. Sida, Avdelningen för forskningssamarbete, Stockholm.
- Eduards, K., 2006. Review of Sida's Research Cooperation. Synthesis Report. Sida Evaluation 06/57. Sida, Secretariat for Evaluation and Internal Audit, Stockholm.
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- Lenefors, L., Gustafsson, L. och Svensson, A., 2006. Organisationsstudie av SAREC. Sida Evaluation 06/22. Sida, Sekretariatet för utvärdering och intern revision, Stockholm.
- Rath, A. et al, 2006. SAREC Support to International and Regional Thematic Programs 2000-2005. Main Report. Sida Evaluation 06/40. Sida, Department for Evaluation and Internal Audit, Stockholm.
- Rath, A. et al, 2006. SAREC Support to International and Regional Thematic Programs 2000-2005. Individual Reports and Cases. Sida Evaluation 06/40:1. Sida, Department for Evaluation and Internal Audit, Stockholm.
- The publications can be downloaded from Sida's home page, www.sida.se.

# Sida's Development Research Council

Sida's Development Research Council (popularly known as U-forsk in Swedish) has now operated for 30 years and supported Swedish development research programmes. The programme and its management has now been reviewed and assessed.

U-forsk is a small programme. It is composed of several types of grants, including special invitation areas perceived as areas of special priority. It has averaged 100 MSEK/year in 2001-2005 (roughly 10% of SAREC's budget), which corresponds to 0.4 % of the research volume of the Swedish university system. It constitutes 0.37 % of total Swedish development cooperation (2006) and 0.7 % of Sida's budget (2005).

The research grants have a short duration (average 2.4 years) and are relatively small. Often the research grants have been combined with other funds and have sometimes paved the way to larger grants from e.g. the EU. The limited volume of the programme hence cannot be expected to substantially influence the Swedish research system.

A greater influence could result if the programme had been concentrated to specific issues and themes. To some extent, though not by design, this has happened as a small and relatively constant set of institutions receives a considerable share of the budget. The programme's knowledge contribution to development cooperation is limited despite the obvious knowledge needs that exist to make development cooperation more effective and efficient.

The report author concludes that given the current volume of the programme, the potential of the Swedish research system has not been fully realized. Many of the best research environments are not reached, and the programme's contribution to development cooperation is less than could be expected. The report author analysed how the programme relates to the programmatic goals of the development cooperation. No such systematic links were found with the exception of the so-called invitations areas, which are, however, limited in terms of budgets.

### Simplified goal formulation

There are six sub goals formulated for the programme. They are not clearly operationalised, nor are the grant types and outcomes of applications related to the sub goals. Therefore, the evaluation suggests that the goal formulation is reworked to become simpler, better structured, and easier to relate to grant types. An alternative proposal is to speak of three sub goals that will structure the programme:

- to strengthen and contribute to the development cooperation;
- to create unique new knowledge for development cooperation and global development;
- to maintain and renew the Swedish human resource base.

As mentioned above, the impacts of the programme on the Swedish research society, and on groups that attract large research grants, are negligible. The programme has a greater importance for small institutions, for a selected few research groups, and as an entry to other financial sources.

The programme mainly addresses individual researchers and doctoral students. The interaction and dialogue between universities, faculties, and strategic research institutions can be considerably strengthened. There are also good examples of how specific tasks, currently handled by SAREC, can be delegated to universities.

Research projects supported by the programme in general deal with relevant development issues. The research groups involved are keen to contribute to development research in various forms and capacities. There are some administrative limitations to possibilities to combine different SAREC supports (e.g. U-forsk and bilateral support) that constrain the full exploitation of this interest.

### **Closer link to Sida**

The author found it cumbersome to get a complete picture of how Sida is making use of the Swedish research system, or how far the U-forsk programme supports Sida as a whole. On the latter, the impression is that such support is limited. The invitation areas are a positive example, but too small and time constrained.

A closer link of part of the programme to Sida's general work is desirable, but the size of the programme is too small to fully cater for such needs. Sida also uses other sources and channels to acquire research competence for specific purposes. It should be considered to transfer such funds to the Research council to be tendered to increase competition and augment quality of research, all assuming that SAREC is considered a common and demanded resource for all Sida departments.

### Basic research vital

For 50 years development cooperation has grappled with the complexities, and our limited understanding, of underdevelopment. Many development issues seek solutions from science in areas such as agricultural production, health, and production of goods and services. Basic research has, at times, generated crucial contributions.

There are parts of Swedish research that have a bearing on development issues but are financed from sources other than Sida. It is vital that SAREC participates in high quality basic research relevant to development. Sida cannot be the main funding agency of such basic research, but has to play a prominent role as a dialogue partner.

The author pinpoints some problems in the programme's present mode of operation.

• It is only a small part of the programme that is directed by needs of the development cooperation

• For a long time a limited number of institutions have received many small grants. Longer and possibly larger grants would enable the best and most relevant research groups to increase their ambition and plan ahead.

• Isolated doctoral projects are not a good approach to recruit young researchers. Rather, doctoral projects should be a part of larger programmes, and focus should instead be put on supporting post doc studies. • SAREC has no contacts with sections of Swedish research of long-term importance for global development and development cooperation. However, SAREC could improve these prospects, in collaboration with other research funding institutions, through directing part of the programme to long-term support of relevant research of the highest international quality.

### Three possible main goals

The terms of reference for the evaluator asked for comments on alternatives for announcing and approving grants. The author finds that the current procedure stimulates a high research quality but suggests that the programme has to be divided according to goals and purposes, and that different assessment systems would apply for these. The proposal illustrates three possible main goals and purposes:

One part would address direct strengthening of, and contribution to, development cooperation. Development relevance, while observing scientific quality, becomes of central importance. Projects would be considerably longer, evaluated, and involved research groups would serve as a resource for Sida. Analyses of particular importance for the development cooperation, such as state-of-the-art reviews and area studies, could be encompassed under this category.

A second part aims to generate genuinely new knowledge relevant to development. It implies research of longer-term relevance, emphasis on scientific quality, and collaboration with leading scientific institutions. It is assumed that other funders and the universities themselves will share the costs, and that grants would have a longer duration.

A third part would focus recruitment of younger scientists and expanding the competence base. A shift from doctoral projects to post doctoral projects should be introduced.

### No detailed instructions needed

The report underlines that the university institutions should be appreciated as competent to implement research, and that research implementation does not have to be detailed by instructions from SAREC (also recalling the relatively small grants in question). SAREC should increase its contacts with researchers and systematically follow up results to improve its learning and feedback.

Staff writer



# Working with farmers and local institutions to improve soil quality in Sub-Saharan Africa

### Erik Karltun, Kristina Röing de Nowina, Linley Chiwona-Karltun, Mulugeta Lemenih, Motuma Tolera, Tadesse Berisso

African agriculture displays stagnating productivity, and there are serious concerns about declining soil fertility. Aspects of soil fertility, farmer management of soils, and possible approaches to restore soil fertility and augment carbon sequestration are the subjects of two SAREC funded research projects. Participatory methods are used. General principles for soil improvement are known. However, their application has to consider local constraints and opportunities. Solutions are often not technical, but rely more on institutional innovation, and require participation of many stakeholders, e.g. local institutions, extension, agro-dealers. Research of this character is of strategic importance. It is also challenging, long-term and has to be mainstreamed in agricultural innovation systems. Swedish researchers have limited or complicated opportunities to fully participate in such efforts.

Agriculture continues to maintain a central role for many poor economies in Africa, providing up to 34% of GDP and employing no less than 65% of the labour force. According to the World Bank Development Report for 2008, agriculture is a source of livelihood for 2.5 billion rural people in Sub-Saharan Africa, half of which are smallholder farmers, and more than half of these are women (World Development Report 2008; cf. Boserup 1970). Paradoxically, it is precisely in these agriculture-based economies that the agricultural productivity per unit area remains low, despite yield increasing technologies being tried for decades.

### Stagnating agricultural production

Recent studies confirm that while agricultural productivity in Asia and Latin America has steadily increased, African agricultural production has stagnated, and that the Green Revolution on this continent has been elusive (Djurfeldt *et al.*, 2005). Achievements in agriculture for development have by-passed Africa, and this is largely due to macroeconomic and general development policies that have failed to acknowledge their effects on smallholder households (Smale, 1995).

Extensification of cultivation in order to increase production is not feasible since new land is not available, and the pressure to conserve nature and biodiversity has become paramount (Evans, 1998). Thus, the only viable option to increase production is through intensification, i.e. higher yields, and increasing the number of annual crops.

### **Restoring soil fertility**

However, after decades of low productivity there is a risk that the problem can become chronic due to poor natural resource management. The natural resources, i.e. soils and water, which are the pre-requisites of agriculture, need to be managed in a sustainable manner. This is not the case today. Soils are being mined of nutrients (FAO, 2001; van de Pol, 1992) and organic matter content in African soils is decreasing (Lemenih *et al.*, 2005). This process is not only taking place on soils with an inherent low productivity, but also the high potential soils show a decline in soil fertility. Good soils are on their way to becoming less good soils and, ultimately, may become unproductive soils.

There is both a global and a regional awareness of the problem with the low productivity of African agriculture. During the last 10 years, a number of initiatives have been launched to address the situation. Recently, the Rockefeller foundation has, together with Bill and Melinda Gates, formed the Alliance for a Green Revolution in Africa (AGRA). Kofi Annan, former general secretary of the UN, has spoken about a "uniquely African Green Revolution" as a means of fulfilling the UN Millennium Development Goals. The Comprehensive Africa Agriculture Development Programme (CAADP) under the New Partnership for Africa's Development (NEPAD) and the Africa Fertilizer Summit Declaration are other initiatives/events.

The focus in these initiatives leans quite heavily on plant breeding of high yielding crop varieties, and increased input of inorganic fertilizers, sometimes in combination with organic resources, as a means to increase yields. Regardless of how well intended these massive initiatives are, they stand a risk of failing if they do not involve all stakeholders, particularly at the local level, to adapt to local conditions and preferences. Lack of inputs and poor crop varieties are not the only obstacles to improved agricultural production.

### Two research projects

Even in the early 70's there were already criticisms regarding the role of agricultural research and extension, and its pre-occupation with mono-cropping and row-planting (Belshaw and Hall 1972). This was further exacerbated with the cultural notions and "learned ignorance" that traditional African farming was irrational and backwards, and required immediate intervention (Chambers 1983). In this paper we discuss two research projects funded by the Swedish International Development Agency's (Sida/SAREC) support to Swedish development research; one in Ethiopia and one in Kenya. They are used here to illustrate the diminishing choices that rural farmers in sub-Saharan Africa have when it comes to managing soil fertility and plant nutrient supply. Joint efforts by innovative farmers, local, extension and market institutions are needed to overcome the obstacles to soil fertility management and plant nutrient supply.

### MAKING SOIL QUALITY LAST – PARTICIPA-TORY PLANT-NUTRIENT MANAGEMENT IN THE HIGHLANDS OF ETHIOPIA

The village of Beseku in Southern Ethiopia gives the impression of a community where time has stood still. On closer examination of old maps, taking transect walks and having conversations/interviews with the elderly, indigenous inhabitants and new residents of Beseku, it is evident that everything has changed. Fifty years ago, the area was covered with a mixture of rich forests and open fields. Extensive cropland agriculture was an exception. The population made a living from livestock management. Today the forest, that is neither protected by guards, nor by the community as such, has vanished. Instead, most of the land is ploughed, cattle herds are decreasing, and some farmers have abandoned open grazing in favour of a cut-and-carry system. The reduction of average land holding, and shrinking of open grazing fields compel farmers to adapt to a changing situation in order to survive, if only for the near future.

With so much evidence showing that soil fertility is the main natural resource base for farmers in Africa to improve their productivity, we were interested in deepening our understanding of how the soil properties changed when forestland was turned into cropland. The results were clear: soil fertility is declining, and the farmers in Beseku are acutely aware of this calamitous situation. In one of our focus group interviews Wami Bati, a 78-year old farmer summed it up very well :

"Over the years the soil turns redder and redder and eventually it becomes unhealthy". On the surface, we could not see any advanced attempts to address the problem of soil fertility, be it through extension or other services. By combining quantitative surveys with qualitative research methods, i.e. by using some participatory research methods, e.g. interviews (in-depth, group and focus group discussions), observations and transect mapping, we acquired an deep understanding of the nutrient cycling in Beseku. Observations included a lack of legumes in the crop rotation, low organic matter recycling to the soil, and an increasing dependency on - mostly unaffordable - inorganic fertilizer to maintain a reasonable production.

Why were these farmers' not practicing nutrient management techniques? It was unusual for farmers in rural Ethiopia not to practice mixed cropping (Dougherty 2002), so why were the farmers in Beseku turning to mono-cropping? We also wanted to see if our perception of the problem agreed with the farmers, and if we could identify the factors that prevented the farmers from ensuring a sustainable agricultural system. A part of the project objectives was to test if improved nutrient management techniques could have an impact on nutrient balances, and to investigate if they were acceptable to the farmers.

Our project team comprised of researchers with backgrounds in forestry, agricultural sciences, food science, public health nutrition, and social anthropology. We began by mapping out the area with key informants at different organisational levels. This was followed with a structured questionnaire interview to get a good overview of the situation in the village. Some key findings were further explored during in-depth interviews in group and focus group discussions, matched for sex, age, ethnic group, and livelihood occupation (Cornwall & Pratt 2003). In this context, the farmers were asked which type of plant nutrient interventions that they preferred to test.

### Findings

The project is now in a phase where a number of agricultural experiments have been established. A process has been initiated in the village where the communities themselves are the lead actors in testing different technologies for improving soil fertility. The research team, together with local institutions and other development partners, are providing technical support and facilitating the process of understanding and mapping out soil fertility decline in Beseku.

Farmers used to grow beans. When asked why they no longer cultivate beans, the farmers answered that it was to avoid social conflicts arising from extensive theft of fresh beans directly from the fields. The extent of thievery of beans and social conflict reached violent proportions in the community, and this culminated in a complete abandonment of bean cultivation.

Thus, the only plant with nitrogen fixing properties was removed from the crop rotation system. By triangulating interviews between groups and individuals, it became clear how and why bean production had stopped. The obvious follow-up question looked into whether, and how, bean production could be resumed. In the transitional period from livestock keeping to arable cultivation, the majority of farmers grew beans as they are an essential component of the Ethiopian diet. Socially it was acceptable to have a share of beans from someone else's farm within reasonable "snack tasting" amounts. A local proverb exemplifies this acceptable practice:

"When you come across a bean field or a beautiful woman you cannot pass by without enjoying".

However, with increasing population and deepening poverty, the once acceptable habit could no longer be sustained, and farmers stopped growing beans because of the conflicts that arose from bean theft.

### Coming to terms with bean theft: the role of local institutions

Probing deeper into the sensitive issue of thievery and beans, especially in groups stratified by sex, ethnic group and age, the farmers came to the major conclusion to re-introduce beans in Beseku. It is noteworthy to mention that the women's groups were the first to indicate how this could be done. The men were invited to a joint group discussion where it was indicated that the best way to address the problem was to let the Idirs, a traditional social organization in the community, jointly discuss the issue. The peasant association leaders and school teachers were added in the process so that the youths would understand the implications of bean theft on their diets, and the importance of reintroduction of bean crops to the nutrient condition of their fields. Through the *Idirs*, the communities have now formulated local by-laws which prohibit theft of beans from the fields, and the *Idir* and PA leaders are committed to enforce these by-laws in order to curb theft and re-introduce beans in the crop rotation system.

### Conclusions

Although it is too early to state the impact of this research on soil fertility issues in Beseku, it is plausible that addressing soil fertility issues in rural Africa requires a deeper understanding of rural change, household dynamics and strategies. Even if macro- and micro-economic policies that promote sustainable agricultural growth and production had been in place, households, communities and their local institutions would still play a vital role in addressing such issues as soil fertility and increased productivity. Participatory approaches and encouragement of farmer technological and institutional innovation are necessary. The project continues to document the process. It has assisted the farmers by providing seed to facilitate

the re-introduction of bean production. The effect of this re-introduction on the N balance is followed in experiments on the farmers' fields and will be complemented with in-depth interviews, focus group discussions and observations. The experiences from this research demonstrate to policy makers how small research projects employing participatory trans-disciplinary methods can elucidate complex rural problems, and how soil fertility issues in rural areas can be addressed with local involvement and little resources. The case of bean theft may seem trivial but is an excellent illustration of how general principles for soil fertility and plant nutrient management have to be adapted to, or are impeded by, local conditions. The findings of the project will be published in scientific journals to underline the importance of trans-disciplinary research.

### SOIL CARBON STOCKS, GHG (GREEN-HOUSE GAS) EMISSIONS AND SOCIO-ECONOMICS IN SMALL HOLDER FARMING SYSTEMS IN WESTERN AND CENTRAL KENYA

Lush greenery, boisterous children greeting you with "Mzungu, how are



you?" and the ubiquitous goats welcome you when visiting villages in Eastern and Central Kenya. Although it may appear idyllic, it soon becomes apparent that farmers in the area are facing problems related to declining soil fertility.

The management of soil organic matter content, which is both a good indicator of soil fertility and directly proportional to the carbon stock of the soil, has received increased attention through global conventions, such as the UN convention on climate change (UN-FCCC) and international agreements such as the Kyoto protocol. These agreements offer the possibility of using soil carbon sequestration, and carbon market opportunities, as a means of reducing GHG emissions. This is an opportunity to combine efforts to increase the productivity in agriculture with the global strive to reduce GHG emissions.

Farmer-induced resource management (crop residue addition, crop rotation, OM placement, fertiliser application etc.) can significantly affect soil carbon stocks and GHG emissions (Röing, 2004).

In addition, resource management is related to, and inseparable from, socioeconomical issues where the social, economic and gendered positioning of individual farmers and households have deep impacts on the access, management and sustainability of natural resources (Verma, 2001).

SLU researchers in collaboration with scientists from the Tropical Soil Fertility Institute of CIAT (TSBF-CIAT), a CGIAR institute, are studying farmer management of carbon stocks, and the associated effect on carbon sequestration and GHG emissions in a Sida-SAREC funded research project in Western and Central Kenya. The bio-physical part of the study is combined with studies of socio-economic conditions that drive management of carbon stocks.

Above- and below-ground carbon stocks are being quantified through biomass assessment and soil sampling. Semi-structured interviews with farmers provide information on how fields, crops, trees and hedges are being managed. The research team consists of scientists with backgrounds in carbon modelling, soil nitrogen fluxes and socio-economic research. There is also collaboration with the Kenya Forest Research Institute (KEFRI), on matters related to forestry.

### Findings

This project is not completed, and data on biomass and soil C stocks is being analysed. In terms of management, many farmers grow legumes on their farms, such as beans or cowpea, and apply what manure they can get from their livestock. However, few farmers apply inorganic fertilizers, and then only in small amounts. When asked how much fertilizer he used, a farmer stated that he applied ca 10 kg of  $DAP^1$  for his 0.25 ha of maize. Considering that the soil C content is generally low, around 1%, and that the soil can provide ca 10-20 kg of nitrogen per hectare through mineralization (Röing, unpublished data), it is not surprising to learn that the maize yield is only 3 bags, or ca 270 kg of maize, from that 0.25 ha. The available nitrogen is only one third to half of what is needed.

Recent studies have revealed that there is a growing problem of micronutrient deficiency in tropical soils. Farmers use DAP, CAN<sup>2</sup> and urea<sup>3</sup>, but claim that these are too expensive, and also difficult to access. When asked what recommendations farmers are being given, most reply that "an extension agent used to come by, but not any longer".

This sketchy description of a situation is another illustration of the local complexities when applying general principles for improved productivity. Several stakeholders are needed to address the problem complex. Farmers, scientists, and extension staff need to be involved, but also agro-dealers, to be able to make accessible appropriate fertilizers and usage recommendations. For example, Mavuno fertilizer, which contains micro-nutrients, exists in certain parts of Kenya, but is difficult to find in remote areas.

### Conclusions

An Integrated Soil Fertility Management (ISFM) approach has been developed by TSBF-CIAT, which exploits the synergistic benefits of organic and inorganic inputs (crop residues, farmyard manure, fertilizers), often in cereal-legume crop rotations. It is an important, appropriate and flexible technology, but large-scale adoption requires involvement of many actors. The adoption of a technology depends on how adapted to local conditions and needs it is. Extension agents and agro-dealers can play a vital role in ensuring ISFM principles are adopted and adapted to local conditions. This in turn presumes, however, that they sufficiently understand the principles, manage to communicate them to farmers, and encourage farmers to innovate, given their available assets and these general principles.

### **A**PPROPRIATE AND ADAPTED SOLUTIONS

The cases above have illustrated that the proper pathway to improved soil fertility is often difficult to identify. An improved bean variety with excellent N-fixing properties does not protect it from theft. Efforts spent on plant breeding will then not pay off. Promotion of fertilizer use will fail if fertiliser recommendations are not available, do not consider the local conditions, or if fertilizer is not physically available.

While it is relatively easy to launch large-scale programs based on blanket solutions, e.g. such as distribution of combined improved seed/fertilizer packages, it is more difficult to scaleup participatory approaches where the solutions depend on the local conditions. A participatory approach where farmers have a say, are empowered, and left with choices is a first and necessary requirement. To reach that stage barriers in communication and attitudes need to be overcome. Agricultural extension services where different actors are involved, combined with a toolbox of adapted methods for an integrated soil fertility management, may be part of the solution.

The extension services, in turn, depend on relevant technologies from agricultural research, and the competence and profiles of researchers provided by the education system. Agricultural education and research have demonstrated obvious reluctance to incorporate participatory approaches, and have become more demand-driven. Reforming the extension services to handle contextspecific ISFM improvements is still just a part of the larger agricultural or livelihood extension challenge. Unfortunately, agricultural extension services have as a consequence of economic reforms been downgraded in Africa. An FAO employee told us that "you see only grey hair in the agricultural development offices in many parts of Africa", i.e. over the last 20 years there has been little recruitment of local experts in agricultural development. A renewed effort of capacity building in the agricultural sector in Africa is necessary if a productivity increase is to be achieved. This capacity building should obviously not only focus on technical agricultural aspects, but also have a strong client orientation to ensure that the stakeholders are involved in the development of adapted plant nutrient management. Improved soil fertility and plant nutrient supply often builds on several simultaneous measures where effects will gradually evolve. Such processes cannot be prescribed in detail by researchers and scientists, but also assume that farmers develop their own agro-ecological knowledge to become successful innovators and are able to adjust to changing conditions.

The projects described in this article can serve as interesting examples, but are too small to make a larger impact. Participatory approaches in agricultural development have proven successful, yet mainstreaming such approaches in education, research and extension has been relatively slow. Many of our observations are reflected in newer thinking on agricultural innovation systems, which may offer new opportunities, but also add to the challenges of agricultural education, research, and extension organisations (Davis *et al.*, 2007, Hagmann *et al*, 2007, Hall, 2007).

This article started with the importance of bean theft in a small village and ended up with recognising that new thinking and approaches, and a conducive policy framework, are needed to reverse declining soil fertility in Africa. What does it imply for Swedish researchers?

### IMPLICATIONS FOR SWEDISH RESEARCH FOR DEVELOPMENT

The examples given above may serve as illustrations of the need to consider

the local conditions and multiple stakeholders, if agricultural development is to be effective. Internationally (demonstrated by e.g. the CGIAR), larger, multi-disciplinary, multi-stakeholder projects, within several agro-ecological zones and socio-cultural settings are becoming more common. Action research, research communication, and building of pilot adaptive capacity among farmers are common ingredients to validate results and prepare for successful uptake. Swedish participation in these kinds of projects is low. Funding opportunities for Swedish development research only allows smaller projects, often of a more disciplinary nature. International collaboration is limited, as Swedish development research funding does not e.g. allow salaries for other staff, unlike many other development research donors. There are other funding opportunities that would enable Swedish researchers to participate in such ventures, but the transaction costs and entry fee are often discouraging.

There are also ethical dilemmas with participatory research funded by Swedish development research. Work with farmers rise expectations of future joint activities that cannot be easily funded. Research projects should preferably have a communication and farmer capacity building component to validate results and better prepare for scalingup. Soil fertility processes using ISFM often require time to fully develop; time which is not there.

Disregarding from the difficulties to fund our participation in ideal participatory research projects, there are also challenges for scientists to adjust to an interdisciplinary and multi-stakeholder setting, and still find a professional niche. On the other hand, the experiential learning opportunities for those who have been through the process are immensely rewarding.

#### Footnotes

1 Di-ammonium phosphate; 18% N, 46%  $P_2O_5$ 2 Calcium ammonium nitrate; 25-28% N 3 Urea; 46% N

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# SAREC's support to Swedish development research

This evaluation takes a broader view of SAREC's support to Swedish development research. It hence includes the Swedish Development Research Council ("U-forsk"), the Swedish Research Links for research cooperation with South Africa, Asia, the Middle East, and North Africa, administered by the Swedish Research Council (VR) and amounting to MSEK 35 in 2005, and Swedish participation in bilateral, regional, and international thematic research.

It is estimated that, together, funds transferred to Swedish universities and university colleges from bilateral, regional, and international programmes are greater than the U-forsk transfers. The terms of reference takes a point of departure in the Swedish policy for global development, and requests a broad review of SAREC's support to development research, in particular with respect to its goals, volume and management procedures. The evaluation report is based on extensive review of literature, data, and interviews and discussions with different stakeholders.

**Goals**. At a general level, SAREC's support to Swedish development research is guided by goals expressed in Sida's Letter of appropriation, whereas operational goals are formulated for the Development Research Council and the Swedish links. The evaluators consider the operational objectives less appropriate for several reasons:

• As the goals stand, they can be measured neither quantitatively, nor qualitatively. This in turn may be one reason why so few qualitative follow-ups of grants have been made by SAREC.

• In particular, the goals for the Development Research Council were never sufficiently rooted, or at least, were not adequately followed up. These goals were presented along with a declaration from SAREC that "U-forsk" was just a complement to funding from other research councils and the universities, who would shoulder the main responsibility for development research. Funding of development research by other research councils has since then become negligible.

 They do not reflect current realities and are not in line with policies governing Swedish development cooperation such as e.g. the Policy for global development, the Millennium Goals, and the Paris declaration. Therefore, SAREC ought to formulate new operating goals for support to Swedish development research that are concise, measurable, and well accepted by co-workers and external stakeholders. It is important for SAREC to clarify the role of research in the so-called roadmap according to which, for each country, research is to be seen as a sector in addition to the three concentration sectors.

### Volume

The authors view the scope of SAREC support to Swedish development research as reasonable, given the current division of roles in the Swedish research community, and the importance Swedish development research has for other activities of SAREC, notably the bilateral research cooperation programmes. However, there are three reasons for increased contributions to Swedish development research, namely the diffusion argument, the collaboration argument, and the competence and competition argument. The first argument refers to the relative concentration of support to few "old" universities and departments. There is an interest in development research outside of this sphere to build on in order to add to the volume and quality of development research. The collaboration argument focuses on the present administrative restrictions of the bilateral research programme that rule out funding of Swedish doctoral students and younger scientists and colleagues from recipient countries in joint programmes. The final argument entails that more young researchers from prominent environments would enhance the base for Swedish development cooperation, augment our prospects to secure international research grants and positions within international development cooperation organisations.

According to the authors, an increased support should primarily be funded by, or in collaboration with, other research councils. SAREC is recommended to prepare a plan for new forms of development research collaboration and procedures for implementing the plan.

### Management procedures

The announcement and assessment procedures applied for "U-forsk" and Swedish research links are seen as relevant and in line with the national praxis. However, the administrative and financial follow-up is more comprehensive and systematic than the follow-up of scientific results and development relevance; probably because of the lack of measurable programme goals mentioned earlier. Extending the assessment to procedures used in selecting collaborating Swedish universities within the bilateral programme, the authors did not find the same decision-making transparency.

The bilateral research collaboration is concentrated to a few "old" universities. In 1998-2005 close to 90% of fund transfers to Swedish universities under the bilateral programme were received by eight universities. Twelve of 39 universities and university colleges have at one time participated in the bilateral programme; of those two of the 15 university colleges. Swedish development research would gain considerably if more universities and university colleges participated in the bilateral programme and measures should be sought to that end.

SAREC, as discussed earlier, is recommended to initiate a process to review and revise goals, but further to make a complementary review of the follow-up process and clarify the link between the two. A new follow-up system should enable that projects are also monitored and evaluated with respect to scientific results and development relevance.

The authors propose an open and transparent selection of collaborating Swedish partners in the bilateral programme to provide opportunities for new institutions to participate. New or extended projects could easily be advertised on SAREC's home page. All universities and university colleges could further be invited to express their interest and describe their profile and areas of excellence. Such information would facilitate without restricting the choice of partner of a recipient university.

Staff writer



## Development Research at the Swedish University of Agricultural Sciences

### Johan Toborn

How does development research and research capacity building in developing countries figure in the overall activities of Swedish universities? There is, of course, considerable variation between the universities because of current profile, historical focus on developing countries, and deliberate choice. The Swedish University of Agricultural Sciences (SLU), with an early intensive cooperation with Sida on methods development and regular rural development projects, has seen a gradual transition to development research and research capacity building in developing countries. It is an illustrative case.

### SLU and development

SLU has a history of engagement in development cooperation dating back to the 1960s. Initially, such cooperation was linked to development projects and methods development. SLU was involved in Sida's early programmes for Integrated Rural Development both in an advisory capacity and through training the Swedish resource base, keeping library facilities, and recruiting for the then many expatriate posts. IRD projects were centred on the introduction of Green Revolution packages; a focus that corresponded comparatively well with the research focus of SLU at that time. We may also presume that yesterdays SLU had a more altruistic attitude, probably a greater flexibility in its organisation, and less focus on scientific production. From the onset SLU's cooperation with Sida excluded research collaboration with recipient countries and projects.

With the emergence of SAREC in 1975, research cooperation gradually became the new and, by now, dominating focus of SLU's development-oriented activities. The previous involvement in development projects has declined. SLU researchers, like those of other universities, have increasingly to think of their scientific production, and of securing new grants to sustain that production. Sida has gradually introduced tendering procedures for services provided in development projects, and SLU has not been organised to compete with consulting companies. The heydays of technical assistance are long gone, and with them the opportunities to work in development projects proper.

### Current development profile

Like other Swedish universities, SLU depends heavily on Sida (notably SAREC) to finance development activities. Several evaluations of SAREC in 2006 pointed out that the emergence of SAREC entailed that other Swedish research councils withdrew from development research. Some conclusions stand out:

• Development research at SLU is polarised into relatively small projects financed by Sida's Research Council for Developing Countries and wider programmes to build research capacity in developing countries. The small projects serve to maintain the interest and competence of Swedish researchers. They are granted for different purposes and scientific fields. Typically, a grant amounts to 0.5-0.7 MSEK/year. Research capacity building programmes enable SLU scientists and lecturers to coordinate, lecture and supervise in wider and long-term programmes, where Ph.D and sometimes M.Sc. training of students of collaborating institutions is a core activity.

• SLU's database of academic publications since 2003 contained 664 doctoral dissertations in late September 2007. A scrutiny (with numerous definition and measurement intricacies) of how many concerned conditions in developing countries, and how many were presented by SLU students, reveals some interesting findings. Indicatively, 99 dissertations or 14.9 % of total dissertations concern developing countries. It is estimated that 15 of these works were undertaken by SLU students (many receiving financial support from Sida); the balance being the products of foreign students, many or most of these through capacity building programmes financed by Sida.

• From SLU's Annual Reports, Sida's contribution to total external research contributions has to be seen as significant and on a par with contributions from the EU (for international/European research), but the figures have to be interpreted with caution. Sida's contribution comes from different departments, is not intended for research only, and may contain resources to be transferred to other institutions.

• Tradition, Swedish research financial structure, internal organisation, and perceived probabilities to secure funding from other sources are some conceivable causes why SLU is seldom a partner in wider international development research programmes (e.g. DFID, EU, CGIAR, CGIAR challenge programmes, international development organisations and banks, etc.). Here is a possible space for expansion, whereas an augmented research volume through SAREC and Swedish research councils seems limited, with reservation for possible policy shifts. Let us look a bit deeper into the conclusions:

#### A polarised picture

Over time, SLU demonstrates a relatively stable portfolio of research grants from Sida's Research Council for Developing Countries in terms of project numbers and budgets, see Table 1.

SLU does well compared with the major universities in terms of number of applications and hit rates, keeping in mind that not all science categories are relevant to SLU.

SAREC relies on a traditional decision-making process with science categories and scientific reference groups. Interdisciplinary research may be hard to fit to the categories, and budget constraints in practice rule out broader research programmes. Although these projects usually run for 2-3 years, extension has often proven possible, however. The role of Swedish universities in bilateral research cooperation is analysed in "Sida Evaluation 06/27 – SAREC:s stöd till svensk u-landsforskning". Table 2 below shows payments to Swedish universities 1998-2005 for research capacity building at universities in developing countries (MSEK, "minor" universities not shown). The table underlines that SLU is an important actor in bilateral research cooperation. Including similar support financed by other departments of Sida, SLU may even be the most prominent Swedish partner.

The capacity development programmes are often long-term, sometimes exceeding 20 years' duration, after a series of flexible and negotiated extensions. Major programmes include strengthening the agricultural universities in Nicaragua and Ethiopia, a forestry faculty at Wondo Genet in Ethiopia, animal science in Vietnam universities and, later, in the Mekong Delta (MEKARN), biotechnology research in East Africa (BIO-EARN), and rural development in Vietnam. Some of these programmes have a more confined disciplinary home, but most have appealed to a range of departments. These programmes have significantly added to the capacity of institutions of the countries involved. The number of M.Sc. and Ph.D. students completing or to complete their studies in some cases reach 20+ and 100+ respectively.

In particular doctoral projects provide research opportunities for supervisors, and often generate scientific credit. Some scientists at SLU have become heavily involved in supervision and have, de facto, created an alternative career path. The doctoral format has its limitations, though, as topics are chosen by the students and the collaborating institution, and the research has to be useful in a Ph.D. context. At times. there have been difficulties to identify suitable supervisors, as research topics may fall between disciplinary boundaries, and as context-specific knowledge may be lacking at SLU. Furthermore, there is a generation shift approaching when experienced scientists with broad experience retire. Rejuvenation of the research staff is not uncomplicated. Opportunities to get a broader contextual understanding of developing countries are harder to come by these days. Prospects for a career as a Sweden-based scientist with a developing country focus may seem uncertain, and may also vary between disciplines. A concomitant factor to be recognised is the rapid expansion of research capacity in developing countries.

Sida support to SLU for development research has been instrumental. Like any research grants, the format chosen has also shaped the profile of research undertaken. Research is either carried out in the form of small projects, or as

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Number of projects*	26	26	27	30	28	24	23	24	20	9	2	
Total budget granted, SEK '000	7,348	7,460	7,163	10,455	11,580	10,533	12,156	12,828	11,458	5,170	1,000	97,150

Table 1

\*Source SAREC compilation. Includes planning grants.

### Table 2

Total bilateral support	Support through Swedish universities	SU	UU	GU	LU	UmU	ктн	кі	SLU
1,641	541	72	99	24	62	41	90	29	68
100 %	33%	13%	18%	4%	11%	8%	17%	5%	13%

Legend: SU – Stockholm University, GU – Gothenburg university, LU – Lund University, UmU – Umeå University, KTH – Royal Technical College, KI – Karolinska Institutet.

Source	2006	2005	2004	2003	2002	2001	2000	1999
Sida	60.8	61.3	49.3	37.8	37.1	48.0	58.1	47.1
EU	60.1	65.6	58.2	53.4	48.9	56.6	53.3	39.6
SLF	46.5	47.7	39.8	39.3	23.8	16.	28.6	31.4
Mistra	22.6	30.7	40.2	72.7	52.2	49.2	52.0	34.8
Formas/SJFR	137.7	138.9	127.4	127.4	130.0	112.2	101.2	111.0
Total contributions	602.3	554.1	580.9	603.8	585.0	517.0	597.2	601.5
Sida, % av total contributions	10.1	11.0	8.5	6.3	6.3	9.3	9.7	7.8
Sida/EU	1.01	0.93	0.85	0.71	0.76	0.85	1.09	1.19
Total SLU expenditures	2,176.8	2,185.4	2,214,2	2,244.9	2,165.6	2,070.8	2,014.8	1,885.7

Table 3. Sida contribution over time and compared to other contributors, MSEK (Source: SLU annual reports)

supervision of M.Sc. or Ph.D. theses. It is a rather fragmented output, but one in which synthesis opportunities are not lacking, however. Procedures used to secure grants from Sida, in practice being the only provider of funding for development research, have been transparent and well known. Transaction costs to access other sources of funding have been seen as prohibitive.

### The Sida contribution

External support to SLU is in annual reports either classified as research contribution or research assignment. Research contribution is the most important, and is the category where research council grants are recorded. How has Sida's contribution developed over time, in relation to other contributors, and as a proportion of total contributions? Figures from the annual reports in Table 3 illustrate these magnitudes. Contributions by Sida include all departments, are hence not necessarily earmarked for research, may contain resources to be transferred, and do include support to Sida help desks. Some, minor, support from Sida is recorded as research assignments.

Sida's contribution hence varies between 6 to 11 % of SLU's total research contribution. The ratio Sida to EU contribution ranges from 0.7 to 1.2. Is it fair to conclude that we have managed to maintain a rather high profile in development matters thanks to this contribution? Is it also fair to conclude that our own resources earmarked to development matters have, despite of a benevolent attitude, been modest on the whole, possibly as a consequence of uncertainties regarding how to interpret our sector mandate?

### Changing times and opportunities

• A rapidly changing world implies global, rich and poor country challenges. Research has to address increasingly complex themes.

• SLU with an ambition to become one of the best universities in our areas has to be internationally competitive, also when it comes to development research.

• Research funding is increasingly addressing broader themes, which require multi-stakeholder involvement, consortia-building, networks, research communication, and uptake/validation.

• New challenges such as climate change and variability, water scarcity, globalisation of trade, contagious diseases, etc. blur the distinction between research for poor countries, research on global matters and research for our own benefit.

SLU has paid limited attention to access international funding for development research. There has been some success within the EU-INCO programme. Cooperation with the Consultative Group on International Agricultural Research has increased. Two initiatives have contributed. The Sida-SLU-CGIAR initiative supported post docs, associate experts, Minor Field Studies, and travels to CGIAR institutes, and did stimulate research by some young scientists. A new SAREC/Formas grant window, announced twice, allows senior scientists to work with CGIAR. SLU was awarded 31 of 59 approved applications. Both initiatives were funded from Swedish sources.

CGIAR Challenge Programmes, DFID, EU, international organisations and development banks offer new funding opportunities. Attempts to provide a new framework for agricultural research in Africa through NEPAD, FARA, ASARECA etc are attracting new resources and open windows for advanced agricultural research institutions. Gaining entry to these financial sources and programmes presume complementary approaches within SLU.

Capacity and skills to access international development research funding has to be upgraded. This includes knowing the available windows and their respective rules of the game. Building coalitions and maintaining good relations and dialogue with present and potential future research partners and funders, not least in developing countries, are important elements. Foreign students who have graduated at SLU are important assets.

Strengthened formal and informal networking arrangements to create awareness, interest and stimulate joint action facilitate realisation of new openings for collaboration. Other supporting measures, such as the establishment of research schools and coherent research training programmes, would make SLU more attractive to international bodies looking for partners in upgrading research capacity in developing countries.

Ultimately, SLU has to consider using its own resources as part of its global commitment.

# Development research and the quest for impact

Research and support of research of relevance for developing countries has many labels. Development research, research and development, knowledge for development, partnerships at the leading edge, research for poverty reduction, etc. carry different connotations, but all express the same ambition to produce knowledge that will be beneficial for economic and social development.

OECD defines Research and Experimental Development (R&D) as follows: "research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humanity, culture and society, and the use of this stock of knowledge to devise new applications". The Canadian Development Research Centre, using the very concept development research, describes its objectives as "to initiate, support, and conduct research into the problems of the developing regions of the world and into the means for applying and adapting scientific, technical and other knowledge to the economic and social advancement of these regions". It seems a key feature of the concept is to put knowledge into use.

Research is needed in developing countries, just as in developed countries. Some research will take place in the respective country, some will be undertaken elsewhere, and some will result from across-borders collaborative efforts. Is research in and on developing countries then different from research in developed countries? Is there no research and development work in rich countries? Is it ultimately so that each nation has its own set of dynamic research priorities, depending on topics defined by society or academia, and making accumulated knowledge and existing research capacity a starting point? Does it mean that research in developing countries is "simpler" research? Adapting existing knowledge to local conditions for food security and sustainable natural resource management does not rely on basic research. Genetic plant improvement and combating human diseases unique to poor countries may, on the other hand, require world class research.

### Impact assessment

Development research and its equivalents is an ambiguous concept, but for the strong urge to be useful in society. The combination, to show impact while at the same time deliver research of the highest quality, is a challenge. Here, the adoption of the Millennium Development Goals has presumably added pressure to quantify impact from research, and to show quick impact. Traditionally, lessons learning from impact assessments, research communication and demand-driven research are means to improve research impact. An organization such as the Consultative Group on International Agricultural Research (CGIAR) grapples with this challenge, as can be seen from its mission: to achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, forestry, fisheries, policy, and environment. Impact evaluation of CGIAR research is the subject of intensive methodology discussion and follow-up to an extent not seen for national agricultural research

organisations. Case study approaches are frequent to show effects of individual research projects. On the aggregate level, cost-benefit meta-analysis of the entire research effort of the organization justifies the investment (Raitzer, 2003, see also Enterplan, 2005). This analysis included only large-scale economic expost assessment of innovations. Benefits from new, higher-yielding rice varieties, higher-yielding wheat varieties, and biocontrol of the cassava mealybug were nine times the accumulated costs of the CGIAR under a plausible scenario. Other innovations, if assessed, would further raise the ratio. Cost-benefit analysis of research simplifies poverty reduction to a monetary dimension. At the other end of the scale there are more complex attempts to analyse the impact of agricultural research, using the sustainable livelihood framework (Adato, 2002).

Some research impacts may be direct, others are very indirect. Research uptake and pathways vary depending on type of research, subject, policy or practice impact aspirations, delivery through direct service organisations, or indirectly through education systems, etc. Assessing the impact of research has to deal with intriguing methodological problems. How do we know what would have happened in the absence of the research carried out? How do we attribute impact to a specific piece of research? How do we deal with the temporal attribution of research efforts?

### Demand-driven research

Will demand-driven research improve impact? The wide application of participatory approaches would indicate yes, but this is not the whole truth. Local, often complex, contexts are better understood by locals. Compounding factors at macroeconomic or policy level may not be identified and analysed at local level. Global public goods research may reflect local needs, but are often driven by scientists. It is an intricate question whose priorities matter.

Of great concern is how to institutionalise demand-driven research. Dutch development cooperation supported multi-disciplinary, strictly demand-driven research in six countries in 1992-2004. Research themes were to address the most pressing problems. Research had to be implemented in accordance with the knowledge needs of those who were to benefit from it and with full local ownership. The consultation processes proved cumbersome and incomplete. Researchers' demands played an important role on shaping the research agenda. Success in implementation was mixed. Lessons learned were that 1) a demand-driven approach is not always the best solution, 2) strict adherence to a demand-driven approach isolated the programmes, and 3) dogmatic adherence to a demand-driven approach hindered the growth of a coherent research programme. Dutch support to research has since reverted to a more traditional approach with greater involvement of Dutch researchers and links to other programmes.

Individual research organisations find that adoption of a client-oriented approach to research takes more than learning new methodologies and skills. Heemskerk *et al* (2003) is a good handson illustration of the measures required in an agricultural research organisation to become effectively demand-driven.

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### Staff writer



How did agricultural research benefit me? A good but very difficult question!

# **Bilateral SAREC research cooperation**

SAREC was created in 1975 to support research cooperation. It soon became obvious that a strengthened research capacity was a prerequisite step. For a decade, the support was focused on providing resources to national research councils, presumably following well-established western models. Largely these bodies were not capable of prioritizing research based on scientific criteria. In the next period, complementary research capacity building was initiated through still practised PhD sandwich programmes. Supplementary investments in research infrastructure, equipment, and library facilities were gradually added. Support thus became more institutional and less individual, and gradually shifted to comprehensive efforts to create a research culture.

An evaluation has been carried out of four bilateral research cooperation activities at different stages of development: Mozambique, Tanzania, Bolivia, and Nicaragua. For each of these programmes individual capacity building and establishment of research infrastructure is evident, whereas improvement in research management is less pronounced. How far progress matches expectations is harder to assess in the absence of comprehensive quantitative targets.

Research projects address needs identified by the institutions, but their development relevance is not easy to assess. The link between the research projects and poverty reduction is usually indirect. Research results have been disseminated to a limited extent to the private and public sector, and are seldom applied in poverty reduction processes. A more focused selection of research projects, without sacrificing other qualities, may strengthen the link.

Collaboration between researchers involved in SAREC supported research and between research projects is not well developed. The evaluation also points out that the interface between research activities and other Sida activities in a country is, for a number of reasons, weak. Still, there should be scope for improvements.

The evaluation team expresses concerns about the financial sustainability of the research activities that are now heavily dependent on external contributions. Domestic government or private sector funding is needed and could open for new interesting research.

In general, the collaboration with Swedish partners works well. There are, however, cases where Swedish institutions face difficulties to live up to the demands of the collaborating institutions, provide flexible graduate courses, and cater for the PhD students.

The programme is managed well and dedicatedly. However, research dissemination, university-industry collaboration, and research sustainability deserve more attention. Comments are made about SAREC's sometimes-lenient attitudes to managing the programme, and it is recommended that a borderline be established between what is accepted from a learning perspective and what is required from an accountability perspective. Another observation relates to the monitoring systems that need to define indicators and benchmarks more systematically to monitor progress.

There is little information available on the benefits of international and regional research programmes supported by SAREC for the bilateral research projects, but linking the programmes would have obvious value added.

Overall, the evaluation is positive about the programme and its management. SAREC's approach, long-term commitment, and flexibility are unique. SAREC also stimulates ownership of the Southern institutions in financial matters but could minimize inherent risks through training in financial administration and management, carefully organized research administration and closer supervision. The SAREC programme should continue according to the recommendation of the evaluation team. Areas where improvements are perceived include: 1) cooperation with real-life activities is increased, 2) better synergy with other Sida efforts is realised, and 3) the focused (combined) approach is further refined.

It is also suggested that the long-term perspective is maintained, but with time limits agreed upon between the partners. Further, it is recommended that the interrelationship between research training and education programmes is strengthened beyond the present ad hoc arrangements. It is suggested that "policies about the implicit or explicit interests of involving Swedish universities in the bilateral research programme should be clarified" (Boeren *et al*, 2006, p 6).

A final recommendation seeks to combine scientific and developmental objectives: "In order to further increase the developmental relevance of its research projects, Sida/SAREC should, without neglecting long-term goals, consider giving a higher priority to projects that are able to directly or indirectly improve conditions for the poor, including projects that are able to increase economic growth in general, while securing an equitable distribution" (ibid, p6).

Staff writer

# African research capacity

The Unesco Institute for Statistics keeps a database on science, technology and education statistics. In 16 countries in North America and Western Europe for which data was available, 2.1% of GDP was the average spent on research and development in 2005. The corresponding figure for Sub-Sahelian Africa was 0.4% (9 countries). The average number of researchers per 1,000,000 inhabitants in developed countries was 3,522 (14 countries), compared to 44 (7 countries) in Africa. This is a telling picture of the knowledge gap between Africa and the developed world.

Agricultural research is a subset of the overall research effort. It is predominantly carried out by agricultural research institutes, which may set agriculture aside from other sectors.

The 1970s and 80s saw an expansion of capacity and structural reforms of agricultural R&D (Research and Development). In the 1990s the role of government was redefined, decentralisation introduced, and more emphasis put on participatory approaches. Capacity remains fragmented, however. More than half of the region's countries have less than 100 full-time equivalent (FTE) researchers. Government still employs more than three-quarters of research staff.

The share of higher education's capacity of the total R&D capacity grew from 8 percent in 1971 to 19 percent in 2000, but the individual capacity of many of these institutions remains small. Non-profit organisations were of little importance. In 2000, there was well over 12000 FTE, of which about 40 percent were stationed in 5 of 48 countries.

Time-series data for 27 countries revealed a threefold increase in total numbers of agricultural research staff between 1971 and 2000. A rise in the average level of formal training is recorded for the same period. At the same time, average spending per scientist declined by about half, i.e. fewer resources were available for actual research. These figures mask differences between individual countries. In 1981, SSA investment in R&D were 0.95 percent of agricultural value added, in 2000 the ratio was down to 0.7 percent. A historical, (though somewhat disputed), desirable level of R&D investments is 2 percent of agricultural GDP.

Agricultural research in SSA became increasingly dependent on donor funding toward 2000, although the share of donor funding in 23 sample countries declined in the later part of the 90s. This was partly due to a number of large R&D projects coming to an end. By 2000, donor funding accounted for 35 percent of funding to principal agricultural research agencies, again with large individual variations.

Private sector agricultural research is growing, in particular in developed countries, but is still small in developing countries. In 2000, data from 27 SSA sample countries suggest that private sector agricultural R&D expenditures were 2 per cent of total agricultural R&D expenditures. South Africa accounted for two-thirds of the private expenditures (Bientema 2000).

The new National Agricultural Research System (NARS) agenda calls for a more decentralised and demanddriven model with a broad stakeholder participation. An ISNAR study of seven NARS looked at the reform process and its adequacy (Chema 2003, se also Elliott 2004).

Five major themes dominate the present NARS reform agenda: • A redefinition of the role of government (emphasis on public goods, separation of research funding, priority setting, and implementation);

• Decentralisation of agricultural research geographically, and in terms of decision making;

• Broad stakeholder participation;

• New funding instruments (cofinancing, competitive grants);

• Strengthening of system linkages (between research agencies; between research, extension and farmers; and between all possible partners involved in an agricultural innovation process.

These reform elements were present in all seven case studies but with individual variations. Stakeholder participation was seen essential to make research more relevant. The latter ties in with the quest for research impact, without which public support for agricultural research will probably decline further.

The current reforms make sense, but their success depends on their implementation and adaptation to local circumstances. It should be recalled that in many African countries the environment is not very conducive to reforms of this nature. There is no simple roadmap to reform, and substantial resources have to be earmarked to experimentation, and learning by doing, to facilitate implementation of these institutional innovations.

The reforms signal a shift from generating knowledge to applying knowledge. At a national level, this may imply a shift from strategic and applied research to adaptive research. It leaves open the question: who fills the gap?

An innovation system perspective may better incorporate all actors involved in agricultural innovation than the narrower NARS or Agricultural Knowledge and Information System (AKIS) perspectives. This holistic approach seems to gain ground with governments and donors. The adoption of an innovation systems perspective will have consequences for the work of regional organisations such as ASARE-CA, CORAF and SADDC.

The emphasis on increased stakeholder participation puts producer organisations in a new light. A demanddriven research agenda is more easily captured by the richer, market-oriented farmers. Helping subsistence farmers to organise themselves may not be sufficient compensation. Only when farmers become market-oriented can the innovation process gain momentum. How to help farmers make this transition is crucial to the research relevancy. Even for market-oriented farmers, the supply and demand of agricultural research services is far from perfectly organised.

The new NARS reforms have a potential to make agricultural research more efficient and relevant, but will not solve the problems of reaching African subsistence farmers. Achieving this depends less on technical innovations; a competence area agricultural research organisations has to pay greater attention to.

A FARA study (2006) looked into how sub-regional research organisations and NARS can be strengthened. Questionnaire answers were received from 50 national agricultural research institutes, 12 universities and 4 farmerbased organisations. Several questions were asked under the general headings of: governance and management, financial status and management, scientific capacity and management, and collaboration. The report describes several weaknesses, often serious and long persisting despite several donor initiatives to upgrade capacity. This again underlines the necessity and urgency to explore new ways of strengthening agricultural research in Africa.

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Breaking the viscious circles of African research takes more than traffic control...

## SAREC innovates: University and faculty research funds

Since 1998, SAREC has gradually introduced university/faculty research funds in four African universities – Dar es Salaam (Tanzania), Makerere (Uganda), Eduardo Mondlane (Mozambique) and Muhimbili University College of Health Sciences (Tanzania). This initiative aims at assisting these universities to taking a greater responsibility to set their own priorities, manage research, and provide co-financing of research from domestic sources. The funds have also been expected to support capacity building, including involvement of junior staff, and generate new knowledge.

Hence, the initiative is one element of SAREC in the process approach to establish a research environment and culture within the universities. SAREC's research funds, contrasted to approaches by other donors, are not tied to a specific programme, but are controlled and managed by local university institutions. For the period 2001-2005 the funds provided did not exceed 40 MSEK.

The evaluation, based on perusal of relevant documents and extensive interviews, highlights achievements, constraints and problems encountered in the various institutions.

The overall conclusion of the evaluation is that the funds have been moderately successful. The universities have assumed a greater responsibility for research planning and management, but that much remains to be done. SAREC is still the chosen resort to set priorities. Universities (or governments) have failed to provide own funding to research. Under pressure to teach ever more students, and with already stretched higher education budgets, setting aside funds for research has not been a priority. Without external funding, there would not be much research done in these universities. Researchers in concerned universities find it more rewarding to use their time that is not allocated to teaching, to consultancies or teaching assignments, both of which generate additional income. The research environment is, overall, not conducive.

Some success has been observed with respect to capacity building. Generation of new knowledge has been marginal. Funds were also found to be more successful when integrated with or related to special research programmes. How far the funds have contributed to creation of a research culture cannot be measured, and research funds are presumably best when complementary to other modalities of support.

In the absence of co-financing and in-house priority setting,

in-house priority setting, university funds give little support to institutions and tend to favour individuals.

Some improvements in the local management of funds have occurred. A range of issues identified as important by researchers surfaced: 1) the funding cycle is out of tune with the academic year, 2) SAREC demands that all concerned faculties report through the university at the same time, is a major constraint for managers of these funds, 3) the information on grants awarded is inconsistent and incomplete, making comparisons and assessments cumbersome, 4) the peer review process of grant applications offers scope for improvements,

5) reporting by individual researchers has improved but remains a problem, and 6) SAREC has a responsibility to foster closer progress monitoring at these universities.

Support of research funds requires time before results become visible. The experience has demonstrated difficulties to implement such funds at university level. Scaling up funds on a national scale – a possible development with growing budget support – should be approached with caution to avoid that research is treated and controlled like any other sector.

Staff writer



## SAREC support to universities' information and communications technologies

Sare chas been supporting university-based Information and Communications Technologies (ICT) projects in Bolivia, Burkina Faso, Ethiopia, Honduras, Laos, Mozambique, Nicaragua, Rwanda, Sri Lanka, Tanzania, Uganda and Vietnam. ICT has become essential for modern higher education and research. The total investment has been in the order of 300 MSEK.

Each project was tailored to the specific needs of the individual university. "The projects variously provided strategic and operational ICT planning, computers, computer networks, Internet access, e-mail, web services, central ICT infrastructure, technical training, user training, video conferencing, administrative computing systems, library systems, and electronic journal access.



In addition to ICT infrastructure, the projects provided graduate level training at the MSc and PhD level to both increase research and teaching capacity, as well as improve the quality of the ICT services offered in the universities" (Greenberg & Muchanga, 2006).

All projects included a Swedish partner to work with the university. Until 2002, SAREC also had an ICT advisor at HQ.

The evaluation found that with several noticeable exceptions, the projects have met their goals and benefits have exceeded expectations.

A wide range of benefits are demonstrated, such as:

• Researchers access to literature, web-based services and databases; increased research collaboration, and

facilitated circulation of documents at various stages of completion;

• Instructors have new means of preparing course materials, communicate with students and use elearning tools;

• Students no longer rely solely on lecturers as knowledge source, can take part in education from a distance, and have access to online administrative systems;

• Administrators can replace inefficient paper-based systems, get a better overview of areas they manage, and better respond to staff and student needs;

• Universities are beginning to appreciate ICT and allocate internal funds to ensure sustainability;

• Society at large benefits from the ICT graduates and non-degree ICT courses.

Other benefits included: 1) university ICT specialists have become instrumental in helping the public sector start to use ICT effectively, 2) the ICT policy, and planning process

used, has proven a useful model for similar planning within government, and 3) the investments made in infrastructure have allowed other donors to fund complementary projects.

Not all infrastructure projects were successful, however. Four out of the twelve projects faced various significant problems in design and implementation.

A total of 47 students have been enrolled in sandwich PhD projects, 46 of them in Sweden. The studies progress according to schedule with some exceptions.

Recommendations made by the evaluation, applying to SAREC or Sida as a whole, include: 1) Consider followup projects to ensure that participating institutions have a full suite of ICT capabilities, 2) support inter-university and education networks, 3) support efforts that will lower the high Internet access costs (20-60 times that of a developed country), 4) support ICT planning capacity in post-secondary institutions, 5) support ICT infrastructure projects at research universities previously not supported by SAREC, 6) support ICT infrastructure projects in all post-secondary institutions, 7) ensure that SAREC has in-house ICT competence, 8) clarify and formalize the role of Swedish partners, 8) continue to support the development of ICT research and teaching capacity, and review the extent to which Sidafunded graduate training is required for ICT service organisations.

### Staff writer

# **Research communication**

### Research communication is essential to improve uptake and relevance of research findings.

One-way dissemination of research information is not enough to optimise the returns to investments in research. Careful and flexible communication planning, drawing on specialist skills, can substantially increase the value of research, but, at present, research communication remains an underdeveloped and understudied field. IC-technologies provide new, though not sufficiently evaluated, opportunities for communication. Research funders have an important role in stimulating more systematic research communication.

A synthesis study was made across six of the DFID Renewable Natural Resources Research Strategy (1995-2005) programmes to a) assess the effects of their communication and b) learn lessons (Norrish 2006). Communication was a mandatory element in projects, but the strategic use of communication and communication practice differed. Key lessons learned were: 1) flexible communication planning is crucial for research uptake, 2) engagement, often face-to-face, is central to communication for uptake, 3) developing effective communication products is difficult and requires special and diverse knowledge, skills and experience, 4) electronic dissemination of information is common but little is known about its reach and effectiveness, 5) monitoring and evaluation of communication activities is needed, often at a later stage when effects have materialised, 6) good communication practices are not sufficiently shared, and institutional learning and organisational capacity for communication need to be improved, 7) skills, resources and time for effective communication are usually underestimated.

A workshop was convened in 2006 (Bernard) on maximising the impact of development research through effective research communication. Participants represented research funders, research organisations and networks, and knowledge intermediaries involved in communicating research. The participants' answers to some 15 questions relating to research communication revealed differences both between, and within categories. As an example, on providing budget guidelines for grant applications, DFID requires at least 10% set aside for research communication, whereas other funders had lower figures or just a benevolent attitude. A central hypothesis behind the workshop was that effective communication is crucial to maximize the impact of development research, but that thinking and practice has to be substantially improved. Research funders have a critical role in this context. Workshop participants confirmed the hypothesis, but views differed on how to shoulder the responsibility in different contexts. The simple model of linear dissemination of research information at the end of a project is generally discarded, and replaced by the view of communication as a two-way process, commencing at the project initiation. As a consequence, a more imaginative and proactive research communication strategy has to be established at an early stage to keep in touch with different groups. Such a change has implications for the resources and skills needed. Moreover, priorities, attitudes, and incentives may have to be reviewed. In this transforming landscape, funders can provide additional funds or earmark resources for communication, and change incentives to stimulate researchers to emphasise research communication more. Funders can further improve their own communication strategies and become more responsive to research ideas. There are possible downsides of better research communication, for example endangering the independence of research agendas if entirely set by stakeholders, and not handling controversial research findings in a sensitive way. With the broader focus of research communication, assessing the impact of alternative communication approaches assumes a new importance in research impact evaluations (see also Perkins 2006, Butcher 2006).

Research information and communication have often been viewed as essential to influence practice, but there is increasing pressure that research shall also inform policy formulation and implementation. There are common complaints in developing countries that politicians do not listen to researchers. Court (2004, and references therein), describes how researchers have to acquire a good understanding of the policymaking process, the nature of the evidence they present, and the structure of other stakeholders in the policy area who may help to get the message through. An overall strategy is needed for the work, and researchers have to adopt an entrepreneurial attitude. This is a tall order, and maybe policymakers are not the only ones to be blamed.

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# International and regional thematic research programmes

One commissioned review and assessment concerned SAREC's support to regional and international thematic research.

An evaluation team has studied relevant documentation and met with some 130 persons in Sweden and internationally who, in various capacities, are involved with the programme. In 2005, these programmes accounted for roughly 54 percent of SAREC's fund, or 457 MSEK. Thematic programmes are divided into four different themes: health sciences, environment and natural resources, natural sciences and technology, and social sciences and humanities. The box to the right details the organisations/programmes covered by the evaluation and provides a picture of the profile of support. In 2000-2005 these organisations/ programmes have received an estimated support of 1 800 MSEK. The evaluation team reported its analysis in two volumes containing the general findings, conclusions and recommendations, and the individual reports and cases, respectively. The summary below cannot make full justice to the rich material.

The evaluators conclude that SAREC is a highly appreciated organisation and partner. There are, however, a number of new demands that confront the organisation. "These demands include an increased understanding of processes for the generation of knowledge, the conduct of scientific and technological research, the impacts from the digital revolution, and understanding the interactions between science, technology, and application" (Rath, 2006, p5). The latter is often described in terms of innovation systems. Further, development assistance is being transformed, as illustrated by the Millennium Development Goals and the Paris Agenda, for increased effectiveness, coordination, and harmonisation. Collaboration between emerging and developing countries is increasingly appreciated. Private and non-governmental organisations have

### Organisations/programmes covered by the evaluation

CGIAR: CIAT, CIFOR, CIMMYT, CIP, ICARDA, ICLARM, ICRAF, ICRISAT, IFPRI, IITA, ILRI, IPGRI, IRRI, ISNAR, IWMI, WARDA; World Health Organization (WHO), African AIDS Vaccine Program (AAVP), Child and Adolescent Health and Development (CAH), Department of Research Policy and Cooperation ((RPC), Initiative on Vaccine Research (IVR), Program of Research in Human Reproduction (HRP), Special Program on Research and Training in Tropical Diseases (TDR), Uppsala University - International Science Program (ISP), International Foundation for Science (IFS), Council on Health Research for Development, Global Forum for Health Research (GFHR), IDRC, Indepth Network, Democracy and Human Rights (Utkal University), Council for the Development of Social Science Research in Africa (CODESRIA), BIO-EARN (Stockholm Environment Institute/IUCEA), Africa Economic Research Consortium (AERC), Organization for Social Science Research in Africa (OSSREA), Western Indies Ocean Marine Science Association (WIOMSA/ MAMSA), International Centre of Insect Physiology and Ecology (ICIPE), African Academy of Sciences (AFORNET), National Museum of Kenya (RPSUD), Vic Research/IUCEA Inter-University Council in East Africa, Coral Reef Degradation in the Indian Ocean (CORDIO), University of Dar es Salaam, Union for African Population Studies (UAPS), Kinondoni Integrated Coasat Area Management Programme (KICAMP), The African Technology Policy Network (ATPS), Asian Institute of Technology (ATPS), ICDDR,B, Economy& Environment Program for South East Asia (EEPSEA), Consejo Latinamaricano de Sciencieas Sociales (CLASCO), Faculdad Latinoamericana de Sciencia Sociales (FLASCO), Centro Agrononómico de Investigacion y Ensenanza (CATIE).

gained in importance. Science and technology inputs to development have become recognised as important.

#### The thematic portfolio

The themes supported broadly coincide with Swedish development cooperation goals. Special policy directives and guidelines also seem to be reflected in the thematic research programme. Increasing attention to needs and demands of poor countries is also in evidence.

The choice of channels for thematic research is generally appropriate and usually gives priority to well-established regional and international institutions. Grants have a focus on the poor countries in Africa. Support has been provided on a long-term basis and often as core support, where SAREC is one of relatively few donors with such an emphasis.

On the efficiency of resource use, the mission discusses two aspects. First, they conclude that, given the multiple objectives that thematic research support has to satisfy, the operational constraints of SAREC, and the found performance of sampled programmes, the portfolio of support seems efficient with some scope for increased allocation. From the more narrow perspective of administrative costs in relation to financial contributions, SAREC can be seen as extremely efficient compared to other research support organisations.

This efficiency comes at a cost though. "Some of the negative consequences include: delays in disbursement with attendant difficulties for partners; programme officers appear to work in relative isolation; regular monitoring is narrow and limited to project objectives; and time for strategic reflection and planning is scarce. This is compounded by the lack of an adequate information technology within Sida. The limited number of professional staff and their frequent rotation makes it difficult for recipients to have suitable Sida/SAREC counterparts with whom to discuss progress, problems, results, and impact" (ibid, p7).

What then is the impact of the thematic research? Such impacts are beyond the direct control of SAREC, and cannot be assessed unless more profound studies are undertaken. Nevertheless, the evaluation identified many specific programmes that have been highly effective in attaining anticipated results. As pointed out earlier, however, the global and developing country context is changing both rapidly and profoundly. SAREC has changed and learnt over time, but greater and more adjustments are needed to remain effective.

### Organisation management and governance

Sida/SAREC has many interested parties with a stake in their thematic programmes. Management, professional staff, and the Research Committee have to conscientiously balance supply-driven priorities of the Swedish government with demands for support from partner countries. Although the financial accountability of SAREC is clearly demarcated, the evaluation team identifies diffuse accountability structures of Sida/SAREC, and sees overlapping roles and mandates of the SAREC Research Committee, the Sida Project Committee, and Sida's Director General. It is also remarks that the members of the Research Committee have the scientific credentials, but few have hands-on experience of low and middlelevel income countries, though visits to supported institutions have improved the comprehension. A point is made of the fact that no representatives of recipient countries make part of the Sida/ SAREC governance structures despite ambitions to cater for their needs.

The report voices the perception that the potential of the Swedish academic community has not been fully tapped; possibly as a result of the expanding national university system, and an increased interest in global, international and development issues. A need is identified to look at other sources of Swedish funding of development research, including global concerns of importance to Sweden. With the changing development cooperation landscape, there is also need to re-examine how SAREC liaises with other donors. The evaluation speaks in favour of retaining the SAREC programmes distinct from other development programmes.

The report makes clear that SAREC has limited communication capacity, and relatively little information is made available to the public. Information and communication technology platforms do not facilitate access to records. Communications in general need improvement, and feedback that is in the form of more continuous loops to different groups, including senior government policymakers and aid officials.

SAREC has staff constraints that affect its planning, learning and interaction capacity. More professional staff seems warranted in order to live up to mandates and tasks, and to match the staffing intensity of similar research support institutions. A rapid staff turnover and a strong management leads to a concentration of information and decision-making, and the Research Committee members admit to not having a complete grasp of programmes and priorities. There is a further need to increase the field presence and contact with recipients, where alternative solutions are available.

On strategic planning and foresight, the evaluation recognises analytical work carried out, but also expresses that "there appears, however, to be no formal overall and strategic planning process that would allow Sida/SAREC to identify which international and thematic research programme should continue or be dropped, and whether there are new themes that should be added" (ibid p10). There are complex issues emerging that need to be addressed more systematically and "can only be answered with more consistent strategic thinking and foresight of global trends that affect Sida/SAREC's performance."

Overall, the evaluation concludes that the international and regional thematic research programmes have fulfilled their mandates. A number of recommendations are made on adjustments that would improve their effectiveness:

• The government should extend the coherence arguments in the Swedish Policy for Global Development to support research for development, and look into how to address the growing Swedish international interest, the potential decline in Swedish capacity in international issues, and the linkages to areas of Swedish national needs.

• The governance and management structure for Sida/Sarec support should be improved.

• It would be of particular importance for SAREC support to Africa to consider improving the management systems in the broad sense of regional networks, and put greater efforts into spreading best practice lessons.

• Sida/Sarec should harmonize its reporting requirements with those of other donors and recipient institutions to reduce the administrative burdens of regional research networks.

• Sida/SAREC should review the possibility of studying alternative portfolio structures to complement studies of effectiveness and impact of individual programmes.

• Opportunities should be created for greater interaction between recipients and SAREC programme officers.

• Sida/Sarec should try new means of communication such as electronic newsletters, bulletins, etc. as a complement to information made available on the webpage. The information and communication technology platforms should be improved to facilitate access to records, data, and various documents.

• Sida/Sarec should increase its professional staffing.

• "In a changing international environment, renewed efforts should be made for Sida/SAREC to improve the structure and impact of its portfolio, governance, management, and organisational practices" (ibid p12).

Staff writer

Learning from the Renewable Natural Resources Research Strategy

# From research to innovation systems

The Department for International Development (DFID) is widening the scope of its natural resources research by focusing explicitly on innovation systems (IS) to reduce poverty. Many of the elements of the approach were implicit in the 11-year Renewable Natural Resources Research Strategy (RNRRS), which ran from 1995 to 2006, and much can be learned from that experience.

### Key messages

• The Innovation Systems (IS) approach is being adopted within DFID's Sustainable Agriculture Strategy. Elements of it were used by its predecessor, the Renewable Natural Resources Research Strategy (RNRRS).

• The IS approach refocuses attention from research to the process of innovation. Research remains important but becomes just one element of a wider system of activities and organisations. The interaction between suppliers and users of knowledge is at the heart of innovation systems, and this ensures the relevance of the research taking place.

• The various RNRRS programmes incorporated elements of the IS approach as they evolved, such as participatory and action research. However, the inclusion of these elements has been largely unsystematic across the programmes, and has varied in timing, degree and effective-ness. Nonetheless, it is important to distil learning from this experience.

• Some programmes found the IS framework useful in providing guidance for research managers wishing to achieve innovation. Although not a panacea, it provides valuable insights as to why innovation may or may not occur.

• The IS framework indicates which actions taken by managers of research programmes are most likely to be effective in bringing new ideas and technologies into use. An initial system diagnosis is vital.

• The IS approach requires a very flexible and evolutionary approach to programme management and finance.

• An essential feature of the approach is to invest in monitoring the research management process and systemised learning.

### Introduction

The Renewable Natural Resources Research Strategy (RNRRS) saw significant change and evolution over its life. This included a change in focus from producing research and scientific publications to emphasising the impact of research on poverty. The focus also moved from outputs to outcomes and long-term impacts. At the same time, interdisciplinary research, policy and the livelihoods of the poor received more attention.

Several of the ideas behind innovations thinking have been implicit in the Department for International Development's (DFID's) research policy for many years. In line with this, DFID's recent research strategy explicitly adopts an innovation systems (IS) approach, drawing on its own experience from the RNRRS and wider knowledge. This Brief explains what is meant by IS, shares the RNRRS's practical experience of IS and identifies the challenges that lie ahead.

### Background: what is the IS approach?

The IS approach is becoming the dominant paradigm in research funding for most Organisation for Economic Cooperation and Development (OECD) countries. It has also been adopted recently by the New Partnership for Africa's Development (NEPAD) Ministers of Science and Technology.

There is a great deal of literature on the relationship between research and innovation. The literature contrasts two opposing models – the linear model, in which research is completed and then disseminated to end users through some form of extension service, and the IS model, in which users and suppliers of knowledge interact from the outset to ensure that innovation takes place. It is worthy of note that the two contrasting models are really simplified mental constructs of a highly complex phenomenon and neither fully describes practice in its pure form.

The concept of innovation, as used here and in practice, means using new ideas, new technologies or new ways of doing things in a place or by people where they have not been used before. The emphasis is on the word 'using' to distinguish innovation from inventions. Experience over many years shows that 'working with and re-working the stock of knowledge is the dominant activity in innovation' (Arnold and Bell, 2001). The ideas associated with IS as they apply to developing countries are summarised in Figure 1.

In simple terms, the boxes on the right hand side of the diagram represent the suppliers of research, while those on the left represent the users of knowledge (who may also provide essential tacit knowledge). The diagram illustrates the importance of both the supply or 'push' of new knowledge from the research community and the demand or 'pull' from the users of new knowledge. Successful innovations require constant interaction between the organisations and actors who form the users and suppliers of knowledge.

Systematic processes are needed to understand the demand, which comes from a range of different actors, including equipment manufacturers and suppliers, product and service retailers, financial institutions and government, as well as the poor who are the more conventional end users of technology. The IS approach highlights the importance of networks, coalitions and partnerships and the need for effective communication channels among the organisations and individuals that make up the system. Networks can be formal or informal, and both are important. Informal links appear to be particularly vital, as they help foster trust between the various parties, thereby lowering the transaction costs of interactions.

Intermediate organisations, shown at the centre of the system diagram, provide a bridge between users and suppliers. They help to search the range of options available within existing knowledge and find those most suitable for specific users. They can even determine the new knowledge or new combinations that are required.

These and other essential characteristics of the IS approach are shown in Box 1 (developed as indicators in the course of the research). The first six are associated with the innovation process. The last three are more complex and are associated with the outcomes that the system achieves. Broadly speak-



Figure 1. A highly simplified diagram of the major elements of successful IS (Arnold and Bell, 2001)

ing, each characteristic is unlikely to be achieved unless the previous characteristic is also present.

### Box 1. Essential characteristics of IS

- 1. Suppliers and users of research are centrally involved
- 2. User needs are understood
- 3. Investment is made in the innovation system
- 4. Intermediary functions are performed
- 5. Financially sustainable delivery systems exist
- 6. Learning results from iterative action research

7. Pro-poor innovation takes place when new technologies and/or new ways of doing things are observed 8. Institutional arrangements are changed

9. Infrastructure that supports and enables the innovation system to operate effectively is strengthened.

### Innovation in the RNRRS

Many of the elements that make up the IS approach have been incorporated within the different RNRRS programmes as the emphasis on poverty impact has strengthened. This is not surprising for an approach that tries to build on existing best practice in research management. However, the process has been largely unsystematic with little learning across the RNRRS as a whole.

Essentially, the changing direction and emphasis led to parallel shifts in each of the programmes, away from what is known as a linear model of research inputs leading to applications, and towards a slowly evolving, new and wider set of activities that go considerably beyond the earlier set of work supported. The Crop Post Harvest Programme (CPHP) had the most formal and comprehensive approach to IS (Barnett, 2005).

The first change made by all programmes (at differing speeds) was to strengthen the linkages between the generators and potential users of knowledge. The Animal Health Programme (AHP), for example, from 1998 onwards placed emphasis on the dissemination of knowledge in the South. This led to an examination of the barriers to uptake of new methods and the development of new media and formats for dissemination. Similarly, the Post Harvest Fisheries Research Programme (PHFRP) shifted its focus after 2000, when 'dissemination' was considered too passive an approach. Instead, the Programme took up the 'promotion' of solutions. As the RNRRS programmes evolved, they paid greater attention to emphasising the dissemination of outputs of their earlier scientific research. This period saw the development of web sites, the creation of material customised for farmers or extension agents, and the use of other media such as radio, in addition to formal publications in peerreviewed journals.

The new emphasis on reaching the users of knowledge was the first step towards getting them involved more centrally in all programmes. The process of seeking active involvement sowed the seeds for wider partnerships, coalitions and alliances, especially with local research and development institutions and user groups.

As the RNRRS programmes developed, they brought new meanings and characteristics to the concept of partners and partnerships. Initially, partners were restricted to other researchers, but they changed to include many additional actors. The nature of partnerships evolved too, encompassing greater equality (e.g. over the allocation of re-sources) and transparency (e.g. over budgets and accountability).

Most programmes undertook several different types of strategic overviews. For example, the Crop Production Programme (CPP) made early use of the cluster analysis tool to begin pruning its diverse portfolio by identifying core problems and a more specific geographical focus. The Programme also began to encourage interdisciplinary research. This led to further in-depth study of the process of uptake and the barriers to it. The result was a new focus on integrated pest management in eastern and southern Africa.

In brief, the different programmes evolved (at differing speeds, to differing degrees and with differing effectiveness) to include a greater share of social science research (thereby reducing the natural science components) and from basic towards applied research. The evolution also covered the following progression:

• A shift to organising research around beneficiary groups

• Priority given to impact rather than the generation of knowledge for its own sake

• An emphasis on participatory processes to establish demand and prioritise research needs

• Greater follow-on and clustering of projects to allow for continuity of research themes

• More emphasis on dissemination and promotion of uptake

• Increased 'southernisation', with more southern partners and greater expenditure in southern countries (up to 70% of project budgets in some cases)

• Development of explicit capacity building activities

• Establishment of links with private sector stakeholders as partners and research users.

### Programme differences in the IS approach

'Path dependence' is a key feature explained in IS literature. In simple terms, this is described as 'what a company or institution can do today depends on what it could do yesterday, and what it has learnt in the meantime' (Rosenberg, 1976). In the context of the RNRRS programmes, this means that each programme evolved mechanisms that encouraged innovation, but the programmes did so in different ways. This was because of their different histories, internal capacities (e.g. social science and other science perspectives) and the nature of the problems they were addressing. For example, the Forestry Research Programme (FRP), with its focus on trees, worked towards a longer time horizon than the CPHP, with a focus on crops. The range of partners in the CPHP was much broader than in the FRP, which worked traditionally with the public sector.

### Improving the wider innovation system

RNRRS programme managers felt that they were less successful in making investments in some of the more complex characteristics of the IS approach than the aspects discussed above. The following are examples of good practice.

The Plant Sciences Programme (PSP) undertook a number of tasks to improve innovation in varietal selection and plant breeding. This involved changing the rules of the game (institutional learning) and strengthening elements of the IS to shorten the time-scale for delivering new varieties. Projects in Nepal succeeded in reducing this time-scale from around 12–13 years to nearer 7 years.

There have been many efforts over the years to improve the income of small-scale sorghum farmers in Hyderabad, India. A CPHP project helped the researchers at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to work in novel ways with poultry feed manufacturers. The researchers were able to convince the poultry feed industry that sorghum that was unfit for human consumption (mainly due to mould) could be fed safely to chickens and could substitute for high-cost maize. The coalition significantly strengthened the demand side of the system and established links among farmers, the private sector and the Consultative Group on International Agricultural Research (CGIAR) system. Involvement of feed manufacturers changed the nature of the research. Instead of providing conventional micronutrient analysis, the researchers were asked to produce adaptable recipes in a very short time-frame.

A nuance that has not been elaborated by the IS literature is that of the development of new technologies and knowledge that stops or reduces existing non-productive approaches to a problem. An example of such an intervention is the work done by the AHP on tsetse fly control and eradication. The work had great potential for improving animal and human health and brought together scientists, policy makers and non-governmental organisations (NGOs), each of whom had a very different perception of the problems and best solutions. While the initiative failed to have great impact in the short term, it raised pertinent issues that could influence major changes in the 'rules of the game'.

### Lessons and challenges

Without indicators of impact it is difficult to demonstrate that one approach to research management has more impact than another. Impacts can be diffuse, cumulative over long periods of time, and difficult to attribute to particular research outputs. Consequently, the lessons and conclusions given here are largely inferred.

It is believed that the IS approach provides a clarifying framework and some policy directions, but it is no panacea. The IS framework offers valuable insights as to why innovation does and does not occur. It also indicates the most effective actions that can be taken by managers of research programmes in their efforts to bring new ideas and technologies into use.

The value of the IS approach is likely to be increased if it is combined with the insights derived from political economy (what DFID currently calls 'drivers of change'). Such analyses draw attention to the incentives, disincentives and questions about which (research) priorities are to be met, and who wins and who loses from the process. Effective innovation requires a shift in power from a narrow to a wide set of actors.

The essential prediction of the innovation model is that the nature of the research will change through continuous interaction between researchers and other elements of the IS. This requires a very flexible and evolutionary approach to programme finance and management. A systems approach in general and an initial system diagnosis in particular are crucial. The IS approach highlights a series of questions that can influence decision making, yet these are not simple choices and cannot be made routine.

In general, the larger programmes were able to invest greater resources in systematically developing formal systems that assisted their evolution towards an IS framework. The smaller programmes, such as the fisheries programmes, developed fewer formal processes and were guided more by the judgements of the programme managers. The need to involve additional players, combined with the need to attain a critical mass of effort, suggests that greater investment is needed within area programmes (fewer but larger projects, if not programme funding).

One element missing from the entire RNRRS experience was any ongoing,

systematic cross-programme effort to learn from experience and use the knowledge gained to strengthen the evolution of the programmes. (This was due partly to the success of the competitive research model, in which incentives militate against collaboration with past and possibly future competitors). In addition, the learning activities that occurred did not work very well. An essential feature of the IS approach is to invest in monitoring the research management process (quite different from monitoring finances and compliance) to feed back the lessons learned.

A critical challenge for DFID is whether to build on local institutions within developing countries to improve innovation or to set up separate systems that are UK-based. A related question is whether to separate research management from implementation. The innovation literature suggests it is best to emphasise intermediary organisations and the development of joint partnerships based on local institutions supported by one or more external partners.

If DFID's research investment is set in an innovation framework, it will require a more conscious effort (and expenditure) to form links with other donors and to facilitate research funding groups at the national level that include governments, foundations etc. It also suggests finding ways to harness the comparative advantage of the UK and other industrialised countries (e.g. financial leverage could be included as an objective of DFID's research investment). In the same vein, DFID has a responsibility to feed the experiences of research it has funded into the international development process.

### Additional resources

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### About this Brief

This Brief is an edited summary, prepared by Susanne Turrall, of a paper written by Amitav Rath and Andrew Barnett (2005): *Innovation systems: Concepts, approaches and lessons from RNRRS.* www.research4development. info/thematicSummaries/Innovations\_ Systems\_Concepts\_Approaches\_and\_ Lessons from RNRRS P1.pdf

Reprint of RNRRS (Renewable Natural Resources Research Strategy) brief From research to innovation systems produced by the Department for International Development (DFID). Printed with DFID permission.

# Innovation and innovation systems – the latest fad or a new start?

The previous article described DFID's shift of attention from research to the process of innovation. The Renewable Natural Resources Research Strategy and its successor, the Sustainable Agriculture Strategy, are fairly large and long-term programmes managed by DFID and those contracted by DFID. It is an approach sometimes described as an institute without walls. Innovation and innovation systems (IS) thinking seem to make inroads at farm, university/research institute, national and global levels. Is it the latest fad or a new start?

### IS gaining ground

The IS approach is becoming a dominant research paradigm in OECD. The concept also permeates thinking at NEPAD and FARA (2007). The Swedish research policy, as reflected in Government bills since 1981, has increasingly seen research as integrated into societal development (Benner et al, 2007).

National innovation system theories originate from many schools and disciplines, many still falling back on the linear model, where research is disseminated and contributing to knowledge, and where a narrow definition of innovation system is applied. Focus has to be shifted to people and competence and how relations and interaction between people fosters learning, not least in an era of global learning (Lundvall, 2007).

In an early study commissioned by the Commission of Development Related Research in Denmark, Arnold *et*  *al* (2001) suggested that for developing countries the working and reworking of the stock of knowledge is more important for economic development than new knowledge. Creative imitation is the central process in capitalist economic development. "... science is much more significant as a source of trained people than as a generator of new knowledge, inventions and innovations (p 315)".

Focus on research for development hence has to be replaced by a closer engagement with the innovation system as a whole. It is only when a country is at the edge of the science/technology frontier, that science will lead development. Such cases may often involve tackling specific local problems in health or agriculture.



Innovation and tradition

DFID, in its strategy for research on sustainable agriculture, has an interesting emphasis in one of its four components: the research into use component in which up to 30 successful technologies funded by DFID will be promoted.

### Critiques

There are certainly critiques of the innovation system perspective on agricultural research. "The innovation systems perspective argues against the perception that technological change drives social and economic development, suggesting instead that development is driven by the institutional context on which technological change occurs. ...

However, to be relevant in the context of developing-country agriculture the literature requires further development and application. Much of the emerging literature in this area is limited by a lack of perspective beyond the conventional role of the public research organisation; few methodologies beyond un-generalisable, context-specific descriptive analysis; limited relevance to policy analysis and policy makers; and limited relevance to poverty reduction and food security" (Spielman, 2006, pp50-51).

But innovation and innovation systems are here to stay. The World Bank takes stock of real-world agricultural innovation systems in *Enhancing Agricultural Innovation: How to go Beyond the Strengthening of Research System* (2006) to assess its usefulness to guide investments in agricultural technology development and economic growth. National and regional workshops and initiatives work in the same direction.

Promoting farmer adaptive and innovation capacity have a different history in participatory approaches and experiential learning. At the core is still innovation, but with less attention to the larger set of relationships and institutional arrangements needed for a functional innovation system. Farmer Field School approaches for example, applied on a number of topics in many countries, may eventually link up with national innovation systems (Braun et al, 2006).

Fad or new start – time will tell. The linear or transfer of technology model has demonstrated its shortcomings.

It was followed by farming systems research, and then farmer first & participatory research. Now the paradigm of agricultural innovation has reached interactive learning for change & innovation systems. These earlier approaches are often discussed as right or wrong, but are in reality additive. Innovation system approaches have to create space for diversity and sharing innovation experiences. Still, the innovation system approach has to prove its value in practice.

#### Staff writer

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# **Organisational study of SAREC**

Sida's letter of appropriation for 2006 instructed Sida to make a review of its support to research and research capacity building. A commissioned evaluation looked into the efficiency and effectiveness of SAREC's management of the research support. The report of the evaluation team is based on document studies, interviews and a web-based questionnaire.

SAREC is a combination of an authority with a classical line organisation and a research council. Major advantages of the organisational format are: 1) the assurance of scientific quality, 2) the long-term perspective needed in a research context, and the avoidance of influence from short-term political goals, 3) the specific earmarked resources to research that are necessary for a long-term perspective (though there are arguments that support to research could capture an even greater share of Sida resources (app. 6% at present) if competition was allowed between different sectors of Sida), 4) a Research Board that guarantees that research financed by Sarec keeps a high international standard which strengthens the interest in development research.

A number of *areas for development relating to organisation and working procedures,* not all included below, were suggested for SAREC's consideration:

• SAREC has the potential to become a lead agency for research collaboration as a means to poverty reduction and should work out a strategy for mobilising other donors for such efforts.

• Mandate and roles of SAREC may be relatively clear. SAREC should, however, in dialogue with other stakeholders establish a policy for the role of research in development and elaborate its importance for poverty reduction.

• Systems for monitoring and evaluation of results have to be further refined.

• Improved systems for monitoring and evaluation in turn require that goals are reviewed and made measurable from the Letter of Appropriation to targets for the individual staff member for a results dialogue.

• SAREC should consider an organisational approach that builds on result-based teams.

• Clear criteria are worked out for choice of collaborating countries and institutions

• The division of roles between Swedish research partners and SAREC should be reviewed and clarified.

• The Research Board should regularly discuss how to optimise its working procedures.

A number of areas were identified where *SAREC's relations to other parts of Sida and the overseas embassies* could be further developed:

• Country strategies govern Swedish development cooperation. SAREC's role in formulating such strategies should be clarified and research cooperation given more attention in the strategies than in the past.

• Sida should consider making research a profile area in possible concentration of interventions. Sida/SAREC is well suited to become a lead agent in this area.

• SAREC has developed alternative models for sharing work and responsibilities between SAREC and the overseas embassies. Lessons should be learned from the models for further elaboration of the cooperation.

• Integration of interventions between SAREC and other parts of Sida has evolved in recent years but there is still scope for improvements. Potential synergies exist with the education sector and with the infrastructure and industry sectors, where emergence of innovation systems and growth clusters may have special relevance. SAREC is encouraged to produce a position paper on research on innovation systems in a development context.

• SAREC has no specified role in the generation of knowledge within Sida and should increase its links to units working with organisational development, learning, and policy and methods development. • Where favourable conditions exist, other units of Sida could generate descriptions of prioritised research issues to be used in SAREC's relevance assessments and *vice versa*; research is put to use when planning and evaluating interventions by other units of SIDA.

• Applied research funded by SAREC has occasionally been put to use in innovation systems but there is a general gap between research and putting research to use through other units of Sida.

*The dialogue between Sida and the Government Offices* matters for the effectiveness of development cooperation. Some opportunities exist to further this dialogue with respect to research:

• Clarification of goals and refinement of follow-up systems would enable an intensified and evidence-based dialogue. SAREC should develop a position paper on how research interventions can be used to link research and policy in a development context.

• Sida and the Ministry of Foreign Affairs should emphasise research as an important area in development cooperation and an area where Sweden has comparative advantages.

Finally, the authors identified SAREC's cooperation with other authorities as a possible area for further development. Cooperation with the Swedish Research Council, Formas, and VINNOVA has evolved in recent years and exemplify how SAREC may benenefit from other research funders.

• SAREC should consider negotiating framework agreements with such organisations, as is practiced by other parts of Sida with authorities relevant to them.

• Sida/SAREC should look for increased cooperation with other units in the Swedish system for research funding. An intensified debate about the role of other research funding organisations in the light of the Swedish Policy for Global Development is warranted, and SAREC can contribute valuable experiences to such a debate. ■

### Staff writer

### World Development Report 2008: Agriculture for Development

### WDR launch at Sida

**NEWS** 

The World Development Report, issued by the World Bank, is an annual flagship report on themes of contemporary importance. The 2008 report addresses Agriculture for Development. It is the first time in 25 years that agriculture has made the thematic headlines. The report stresses that agriculture has a role to play in poverty reduction, and urges for a reversal of years of policy neglect, under- and mis-investments in agriculture. Presumably this is welcome news for many.

The report was presented at Sida on 14 November 2007. Opening addresses were made by Göran Holmqvist, Acting Director General of Sida, and Gunilla Carlsson, Minister for International Development Cooperation. The report was then presented by the Bank through Derek Beyerlee, report team leader, and Mark Cackler, Acting Director for Agriculture and Rural Development. A panel discussion was followed by questions and comments from the audience.

In the afternoon the African analysis in the report was elaborated by Derek Beyerlee and Eija Pehu. Discussants (Kjell Havnevik, Nordic Africa Institute; Jean Philippe Audinet, IFAD; and Lars-Erik Birgegård) gave their views on the report.

It is obvious that report has been appreciated as a timely input into the development discourse. It is also obvious that the analysis in the report is disputed as incomplete or even faulty. One expression is the report by the Nordic Africa Institute, published at the time of the Swedish WDR launch, with the telling title *African Agriculture and the World Bank: Development or Impoverishment?* (www.nai.uu.se/publications/books/book.xml?id=25256)

### The report

As usual, the report is an impressive document, with numerous tables, graphs, cases and econometrics. A core team has compiled the report, and has drawn on numerous contributions and a number of review processes. How the reader interprets the analysis and the recommendations depends on the glasses used.

The report claims "agriculture continues to be a fundamental instrument for sustainable development and poverty reduction". Agriculture, however, plays different roles in the agriculture-based, transforming, and urbanized worlds. In agriculture-based countries, agriculture is a basis for economic growth and requires a productivity revolution in smallholder farming. In transforming countries, addressing income disparities is a priority that requires multiple pathways out of poverty, with focus on high value production, decentralised economic activities, and move out of agriculture. In urbanized countries, remaining rural poverty can be reduced through value chain linkages, employment creation, and payments for environmental services. The report states that the "environmental footprint of agriculture can be reduced, farming systems made less vulnerable to climate change, and agriculture harnessed to deliver more environmental services".

To make all this happen, agriculture governance has to improve at all levels.

Three main questions are addressed by the report: 1) what can agriculture do for development, 2) what are the effective instruments in using agriculture for development, and 3) how can agriculture-for-development agendas best be implemented?

What can agriculture do for development? The authors argue that agriculture is a unique instrument for development. It contributes to development as an economic activity, as a livelihood, and as a provider of environmental services. These contributions differ in the three worlds. To some extent, the construct of the three worlds captures the economic and social heterogeneity in rural areas, but they also exist within the respective world. Therefore, policy reforms relating to agriculture have to be differentiated, but there will always be winners and losers of policy change. Agricultural development has been effective in reducing poverty. It can still be the lead sector in agriculture-based countries. This, the Bank argues, follows from staple crops being relatively shielded from external competition, while comparative advantages are harder to find in manufacturing. However, this potential has not been used due to policy failures, and low public spending on agriculture. New opportunities are emerging. "Dynamic new markets, far-reaching technological and institutional innovations, and new roles for the state, the private sector, and civil society all characterize the new context for agriculture." Value chains offer new opportunities for smallholders and their organisations. If they cannot capture economies of scale, labour-intensive commercial farming offers alternatives. The new role of the state implies a more "visible hand".

What are the effective instruments in using agriculture for development? Several broad categories of instruments are perceived in using agriculture for development: "improving the asset position of the rural poor, making smallholder farming more competitive and sustainable, diversifying income sources toward the labour market and the rural non-farm economy, and facilitating successful migration out of agriculture".

Access to assets emphasises land, but also includes water, education, and health.

More productive and sustainable smallholder farming will be achieved through a combination of: 1) price incentives and increased/improved public investment, 2) better product markets, 3) improved access to financial services and reduced uninsured risks, 4) better performing producer organisations, 5) promotion of innovation through science and technology, and 6) enhanced sustainability of agriculture and its capacity to provide environmental services.

Promotion of innovation through science and technology holds a special interest as a historic solution to agricultural development. The report illustrates how agriculture-based countries spend proportionally less on agricultural R & D, and how public agricultural research organisations are often performing poorly. Higher-value markets and value chains may provide new institutional options to R & D. "A further challenge is to narrow the income and productivity gaps between favoured and less-favoured regions. Better technologies for soil, water, and livestock management and more sustainable and resilient agricultural systems, including varieties more tolerant of pests, diseases and drought, are needed in the latter regions. Approaches that exploit biological and ecological processes can minimize the use of external inputs, especially agricultural chemicals. Examples include conservation tillage, improved fallows, green manure cover crops, soil conservation, and a pest control that relies on biodiversity and biological control more than pesticides. Because most of these technologies are location specific, their development and adoption require more decentralised and participatory approaches, combined with collective action by farmers and communities." Biotechnology is mentioned as having a potential for smallholder farmers, but low public investment and private sector focus on commercial potential has so far impeded benefits to smallholders.

How can agriculture-for-development agendas best be implemented? The last section of the report discusses pathways out of poverty for each of the three agricultural worlds. Rural households will seek their livelihoods through combinations of farming, agricultural or non-agricultural employment, or migration out of rural areas. An agriculturefor-development agenda requires a policy framework based on the behaviour of actors in the system. How to do it, requires effective systems governance.

Each country will shape its own agenda for agriculturefor-development. A starting point – or preconditions –is the existence of a favourable socio-political climate, adequate governance, and sound macroeconomic fundamentals.

A national agenda will combine four policy objectives ("the policy diamond") that contribute to pathways out of poverty: 1) improve access to markets and efficient value chains, 2) enhance smallholder competitiveness and facilitate market entry, 3) improve livelihoods in subsistence farming and low-skill rural occupations, and 4) increase employment in agriculture and the rural non-farm economy, and enhance skills.

Specifically for Sub-Saharan Africa, the agenda is to "enhance growth by improving smallholder competitiveness in medium and higher potential areas, where returns on investments are highest, while simultaneously ensuring livelihoods and food security of subsistence farmers." Four distinct features characterise this agenda: 1) it is multi-sectoral, 2) agricultural development must be tailored to local conditions, 3) the agendas must be coordinated across countries, and 4) priorities must be given to conservation of natural resources and adaptation to climate change to sustain growth. There are two perceived challenges to implement the agriculture-for-development agenda. One originates in the political economy to overcome policy biases against agriculture, underinvestment and misinvestment. The other is found in strengthening the governance for the implementation of agricultural policies. Failures on both accounts were behind the limited implementation of the 1982 World Development Report on agriculture.

The situation today looks better. Broader economic and general governance reforms have been put in place. The political economy is changing in favour of agriculture and rural development.

The agenda also calls for new roles of the state in market development and better natural resource management, but stresses the need to strengthen the capacity of the state, including agricultural ministries.

A strengthened civil society can improve the representation of the rural poor and, hence, governance.

A mix of centralised and decentralised services is called for. Decentralised institutions have to avoid local elite capture and social exclusion. Community-driven development has a potential still not fully exploited.

In agriculture-based countries, donor contributions constitute a significant share of agricultural development spending. Donors now have to align to the new national and regional frameworks for agricultural development, and to each other.

The agriculture-for-development agenda cannot be realised without more and better international commitments. Global institutions created for agriculture in the last century have a narrow sectoral focus, and are not adequate for the current interrelated and multi-sectoral agenda. Institutional reforms and innovations are needed for greater coordination, including new actors in the global arena.

"... the powers of agriculture for development must be unleashed. But there are no magic bullets. Using agriculture for development is a complex process."

The full WDR 2008 is available at: www.worldbank.org >Data & Research>Research>WDRs>WDR2008>Full Text

### Climate Change, Food Security and Poverty Reduction – Sida Development Area, September 27, 2007

9 The Sida Development Area is a place for the development of ideas, cooperation models and approaches to development cooperation".

On September 27 the area addressed climate change, food security and poverty reduction. The meeting was wellattended and also transmitted via Web-TV

The Development Area theme was introduced by Göran Holmqvist, Acting Director General, Sida, and Mikael Karlsson, Chairman, Swedish Society for Nature Conservation.

A keynote speech was given by Dr. Jacques Diouf, Director General of FAO.

Lizen Schultz, ecologist, from the Centre for Transdisciplinary Environmental Research, Stockholm University, explored Ecosystems, livelihoods and climate change: How can we manage ecosystems to improve human well-being. Her starting point was the Millennium Ecosystems Assessment and its alarming findings.

Dr. Matima Juma, Board member of International Federation of Organic Agriculture Movements, IFAD Country Officer in Tanzania and organic farmer described the potential of organic agriculture for food security.

Rajendra Singh, founder and president of the Tarun Barath Sangh organisation in India, narrated how the organisation revived traditional water harvesting structures in Alwar district in Rajasthan through community involvement. Water generation led to further development in forest management, tree planting, agricultural improvements and pre-school education, and to significant livelihood improvements in the area.

Adanech Onke of the Ethiopian Evangelical Church Mekane Yesus reported how the Boshoana-Ilgira Integrated Rural Development project turned a drought-stricken area around. Terraces, using compost and mulching, introduction of short maturing varieties, dry season production, tree planting were the most important elements of a wide menu.

Dipal Chandra Barua, Managing Director of the Grameen Shakti, Bangladesh, gave insights into innovative approaches to introduce sustainable energy solutions like solar, wind and biogas through a combination of appropriate technologies, micro-credit, income generation, and renewable energy entrepreneurs.

Leif Selhagen, Managing Director of NAPS Sweden AB, looked back on 30 years experience of introducing solar for different target groups in developing countries.

Details available at: www.sida.se>Training and Seminars>Sida Develpment Area>27 sep 2007: climate change, Food Security and Poverty.

### Sida Position Paper – Natural Resource Tenure

Asida Position Paper on natural resource tenure presents key messages and describes Sida's entry points. Key messages include:

1. Secure tenure rights for the poor is key to poverty reduction and the realisation of fundamental human rights.

2. Tenure interventions must build on local conditions and include a thorough understanding of local practices and customary tenure rights

3. Women's security needs special attention. Women responsible for household income, food and children often lack secure access to resources owing to discriminatory norms and practices.

4. Tenure security may be promoted through formalisation of rights, which may be done in different ways. What best serves the poor depends on the context. While individual titling is relevant ion some cases, registering collective rights or long term use rights is more appropriate in other cases.

5. Control over natural resources is an important source of power. Establishing pro-poor tenure systems requires tackling power relations at all levels by applying principles of democratic governance. 6. Securing tenure requires tackling both technical and political issues. Enabling access to the resource tenure system on the part of the poor is key to avoiding elite capture and ensuring equitable benefit sharing.

7. Weak tenure systems and resource competition are root causes of conflict. Addressing tenure may be a key step towards consolidating peace in post-conflict societies.

8. Secure tenure promotes sustainable use of resources. Environmental degradation is often the result of inappropriate tenure systems.

9. Land, water and other natural resources have many different users and overlapping uses. Distinct tenure arrangements apply to different resources and uses.

10. Linkage of resources, such as between land and water or between urban and rural land, requires coordination and cooperation between authorities. Similarly, this applies to nations sharing trans-boundary resources, such as rivers and wetlands.

*Full report at: www.sida.se>Publications, search for Natural Resource Tenure.* 

### The Forest Initiative

A fter some birth labour, the Forest Initiative has seen the light. It is an attempt to meet global challenges, financed by Sida and housed by the Swedish Forestry Association. The initiative is based on the Swedish Policy for Global Development and the Millennium Development Goals, and underlines the (often neglected) multidimensional importance of forests.

Sweden has a great forest sector history, but our international profile is nowadays relatively weak. The comparative advantages of Sweden could be better used if skills and capacities were more adapted to the global forest agenda. Trends that shape the agenda include quickly increasing demands for forest products and services, trade-driven globalisation, new use of forests (energy and carbon storage), combined with examples of deteriorating forests and big investment needs.

The forest initiative is a process approach to global action to address local problems, and to stimulate action and strengthening the Swedish constituency.

Objectives include to:

Mobilise Swedish skills and create networks;

• Develop new and innovative development approaches with forests in focus;

• Identify Swedish strengths and priorities for development work in forestry; • Address "bottlenecks" that prevent sustainable forest management;

• Develop new working channels and areas like private sector and norms for plantation forestry;

• Develop a balanced approach based on the elements of the Swedish Policy for Global Development;

- Promote market-driven pro-poor growth;
- Address global issues, but with Africa in focus.
- The mode of operation includes to:

• Broaden the participation of Swedish actors in the global work;

- Facilitate, stimulate, activate (but not implement);
- Operate with limited seed money;

• Focus on the regeneration of the Swedish human resource base.

Illustrations of possible activities are given, but the details are to be worked out during a nine months inception period, commencing in October 2007.

### Meeting Global Challenges in Research Cooperation

The Sida biennial conferences have become tradition in Sweden to provide a forum for a discussion of problems concerning humanity and nature in the North, South, East and West.

At the conference "Meeting Global Challenges in Research Cooperation", researchers and development professionals will gather and discuss key themes at the frontiers of research and global development issues.

More specifically, we will discuss sustainable energy systems, maternal and child health, water and sanitation, soil degradation, sustainable agriculture, survival strategies of the poor, conflicts over natural resources, housing and infrastructure, human rights, democracy, global trade and climate change. Invited panels will also discuss research training strategies, future priorities in research questions and cooperation in research financing for global development.

All Sida/SAREC financed scientists and Sida staff are invited, as well as all others with an interest in the research areas presented.

### Time and place

Dates: 27-29 May 2008

Venue: Atrium Konferens, Dragarbrunnsgatan 46, Uppsala, Sweden

### Invitation to send in abstracts

We invite you to present your research at the conference. All areas are invited to participate with abstracts. We plan to have ample time for discussion so most results will be presented as posters. Some will also be selected by the scientific panels to be presented at thematic sessions. Send in abstracts before Friday March 14, 2008.

All conference presentations and summaries of discussions will be published in a book, planned to be printed within 6 months after the conference.

Organisers are the Centre for Sustainable Development in Uppsala, Uppsala University and the Swedish University of Agricultural Sciences.

More info: www.csduppsala.uu.se/sidaconference08/

### A Minor Field Study in Bangkok, Thailand

# Juvenile development of fresh water fish in South East Asia

Text and photo: Maria Carlsson

The rapid development in South East Asia puts a high pressure on the environment. In areas that receive a high amount of wastewater, wild fish might be affected by endocrine disrupting chemicals, which might disturb the normal embryo and juvenile development and skew the sex ratio. The Minor Field Study was done to find out if this is true.



One of the many waterways in central Bangkok.

**B** angkok is a striking example of a fast developing city in South East Asia. It is the city of contrast, where shed-like houses are neighbours to super modern and futuristic buildings. It was an overwhelming and intense experience when we first got there, busy, crowded and noisy. But with time we completely fell in love with this city and the Thai culture.

My friend Anna Liliekvist and I are both biology students at Uppsala University and we are interested in environmental and development questions. Therefore, it felt perfectly natural for us to do a Minor Field Study to complete our education. Thanks to Leif Norrgren, professor in ecotoxicology at SLU in Uppsala, we got the opportunity to study the potential effects on fish health with increased pollution in Bangkok.

### The arrival

Our local supervisor, Aranya Ponpornpisit, met us at the airport upon our arrival. She later turned out to be not only a very helpful and excellent supervisor but also a good friend, who was eager to introduce us to the Thai culture. To make it easier for us to find each other she had sent us a photo in advance with the dress she was going to wear and we could easily spot her among all others at the airport.

We were going to do our project at the veterinary medical aquatic animal research center at the Chulalongkorn University where Aranya work as an assistant professor. The university is situated in one of the busiest areas in Bangkok. Luckily we could stay at one of the university student houses only short 15 minutes walk away from the university. Actually a bit longer if we made a safer detour to the concrete bridges, instead of running across the busy traffic lanes where cars, taxis, motorbikes, tuk-tuks (motorcycle taxis) tried to get past as fast as possible.

### Huge fish market

Aranya took us to the fish farms where we could get the zebrafish that we were going to work with in the study. When we went around to different farms we started to understand how big the aquaculture industry is in Thailand. Aranya showed us the huge fish market where



Anna concounty water campion

you could find just anything that you need for fish care. During the project Anna and I went there every now and then to buy fresh fish food (small crustaceans) in plastic bags that were sold right on the streets.

At the department they had a large room with aquariums and basins where they kept different fish and turtles, and in here we could set up our project. The facilities were good and we were also able to take pictures of the fish embryos that we studied.

To be able to collect water from the rivers around Bangkok we took help from a driver who took us around to the different spots. Many things in Thailand go much smoother when you have the right contacts, and to be able to take some of the water samples it was necessary that Aranya used her network to get permission. Even though both Anna and I had some experience of working with the zebrafish before, it is always a bit challenging to work in a new environment and culture. We experienced that the water quality was much more sensitive, probably because the climate produces a different bacterial flora. Therefore, we had problems in the beginning with the survival of the juvenile fish. Nevertheless, things like this make you use your inventive side, and it is a great reward when you finally

find solutions to the practical problems you have been facing.

### **Background information**

South East Asia is undergoing rapid development with increased urbanisation and industrial and agricultural development. This puts a higher pressure on the environment. Most polluting chemicals end up in the water and, consequently, aquatic animals are constantly exposed to these substances. Water and wetlands play a central role in South East Asian agri- and aquaculture, and contaminated water resources might be a threat, not only to animal and human health, but also to this sector of the economy.

The aim of this project was to put focus on the large group of substances called Endocrine disrupting chemicals (EDC). EDC's can interfere with the endocrine system in the body and suppress or depress female or male hormones. EDC's can be found in wastewater from households, factories and agricultural areas, but they also occur naturally in some food, the so called phytoestrogens. The phytoestrogens are present in soybeans, coconuts and several other plants. Compared with other parts of the world the intake of phytoestrogens through food in Southeast Asia is generally high. A large amount of food given to domestic animals and fish are made

from soybeans, and it is therefore of interest to see if the phytoestrogens can affect these animals.

To sum up one can say that the rapid development in South East Asia probably increases the amount of EDC's in the environment which is further enhanced by the large use of phytoestrogens in this area. The wild fish living in areas that receive a high amount of wastewater might therefore be affected by EDC's. This might disturb the normal embryo and juvenile development and skew the sex ratio, which can have consequences for the future fish populations.

### The project

The aim of the project was to investigate if the embryo and juvenile development of zebrafish (*Danio rerio*) were affected after exposure to different waters we had collected from rivers and outlets in Bangkok. The zebrafish is a freshwater tropical species and is a common test organism used to indicate the presence of EDC in the environment. Zebrafish undergo a fast development, and it takes only 72 hours for a fertilised egg to develop and finally hatch. By using a stereo microscope it is possible to study the complete development of the embryo during this time. We studied different endpoints in the development at 24 and 48 hours and compared the results with a control group. This provided us with information regarding abnormal embryo development. The waters that indicated any effects in the embryo toxicity test were later used for the juvenile study. The aim of the juvenile study of



At a tofu factory. Exposure to tofu factory waste water has a negative impact on zebrafish embryo development.

the zebrafish was to investigate if the sampled water had an effect on the sex ratio. Sex differentiation of zebrafish in the juvenile fish occurs at 60 days post hatch and is sensitive to outer factors that can interact with the hormonal system, such as EDC.

### The results of the study

We sampled water from different areas in the three main rivers around Bangkok; the Maeklong, the Tachin, and the Chao Phraya rivers. We also visited a tofu factory where we collected waste water that was released directly into the environment. Since tofu is made from soybeans it was interesting to see if the waste water contained phytoestrogens that could affect zebrafish development. Exposure of embryos at a concentration of 0.5% tofu factory waste water showed a significant negative impact on the development.

This led us to further investigate known phytoestrogens and their effects on the embryo development. By this we investigated potential effects of soymilk and coconut water. The results demonstrated that exposure to tofu factory waste water, soymilk and coconut water had a negative impact on zebrafish embryo development. This was also demonstrated for embryos exposed to water from the Maeklong river. We decided to use water from the Maeklong river, and different concentrations of tofu factory waste water and soymilk in the juvenile study, to investigate whether long term exposure was able to skew the sex ratio.

However, the juvenile study did not give any evidence for any significant difference in the sex ratio when compared to the control group. We think that it can be of importance to further investigate if the embryo malformations we observed in this study can be linked to an estrogenic influence from the samples. Especially when regarding the extensive use of soybean products, other phytoestrogens and an increased release of endocrine disrupting chemicals in South-East Asia.

### The Thai culture and our experiences

We were often surprised that the Thai people were so helpful and friendly. If

you ask someone on the street and they don't understand, they will make sure to find someone else that can answer your question. Things like this make it easy to work in Thailand even if the language sometimes is a barrier.

### Froglegs and crocodile

The Thai people have a great love to their food culture, and as the Swedish people talk about the weather the Thai people instead talk about their food. In contrast to Sweden, where we discuss today's weather and speculate about the weather tomorrow, the conversations in Thailand can instead be "Have you eaten today", "What did you have for lunch" or talking about the food you will cook tomorrow. Aranya and the other people at the department made sure we tried most of the fantastic food. However, some odd experiences included pigs' skin, the feet of a rooster, frog legs and crocodile. Anna who is a vegetarian could in these cases say no thanks with a good reason. I didn't have such reasons so I stopped thinking about the ingredients and tried all the very exotic dishes!

### Religion

Besides the food Aranya showed us other things in Thai culture that you will seldom experience as a tourist. The religion is very important in Thailand, and the monks are shown a lot of respect. In the early mornings the monks collect donations of food from the people and it is seen as an honour to give food to the monks.

Aranya took us to the early morning market to purchase food that we carefully put in the monks bowl since they are not allowed to touch a woman. After this you kneel down in the street in front of the monk and *wai* (greet with your palms together) and he prays for you. This did not feel very natural for us the first time but it felt nice to participate in this ceremony that is common in the every day life for many Thai people. We also had the chance to take part in a special "life extending" ceremony in the temple and I guess time will tell the results of this ceremony...

### The Thai New Year celebration

We were fortunate to be in Thailand



Lunch at the department.

during the time of the Thai New Year (Songkran festival) in mid April. Songkran festival is a cleaning process where you pour water on Buddha images, but now it is has also turned out to be a huge water throwing festival. The streets are crowded with people who throw water on passing people and vehicles. The festival goes on for a week in April, which is the warmest period of the year and thereby very suitable for the water throwing.

We celebrated Songkran together with Aranya in a small city called Nan, situated in the north of Thailand. As the only tourists in the city we drew a lot of attention to ourselves and as soon as we turned up on the streets we got completely soaked. It was great fun, and we were also drawn into the city parade that finished with music and dancing outside the temple. I think both Anna and I will remember these days with a big smile on our faces.

### Reflections

The word *sanúk* in Thai means fun, and in Thailand it is important that everything is done with a touch of *sanúk*. This also includes work and is a really nice way of approaching tasks. Everything can be done with a kind of playfulness and a smile which I think is a very healthy way of living life. I think we could learn something from this by looking at things in a more *sanúk* way! Our experience in Thailand and the work with this project made me even more enthusiastic about continuing work with environmental questions in cooperation with developing countries. Now when I have graduated I am definitely interested in job opportunities in this area.

Finally, I would like to thank all at the Department of Veterinary Medical Aquatic Animal Research Center at the Chulalongkorn University and all other people we met in Thailand for giving us an unforgettable experience!

More information: Maria Carlsson at marcar79@hotmail.com.

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# Rural development professionals associated with Swedish development assistance as per 1 October 2007

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CHINA Lund, Patrik

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