STRENGTHENING CAPACITY FOR AGRICULTURAL RESEARCH AND DEVELOPMENT IN AFRICA (SCARDA)

In a Country Beset by a Critical Skills Shortage: A Lifeline for Research

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December 2011

UKaid
from the Department for International Development

This document is an output from the Strengthening Capacity for Agricultural Research for Development in Africa project (SCARDA) funded by the UK's Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.

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The Gambia is a tiny country in West Africa that relies heavily on small-scale agriculture, yet faces numerous difficulties and constraints in its agricultural system. Crop yields for staples such as groundnuts and maize have been declining over the past thirty years, as soils have grown depleted, crop diseases have spread, and the threat of climate change now looms large. While such challenges have steadily grown both more severe and more complex, however, the country has suffered from serious underinvestment in agriculture: for more than a decade, research has dwindled as key experts have left the system.

Recognizing research as one of the key pillars that is necessary for boosting agricultural productivity in the developing world, the Strengthening Capacity for Agricultural Research and Development in Africa (SCARDA) programme, initiated by the Forum for Agricultural Research in Africa (FARA) and funded by the British Government's Department for International Development (DFID), gave support to help selected institutions across Sub-Saharan Africa address the gaps in their agricultural research systems. The purpose of SCARDA was to strengthen the capacity of people and institutions within these systems to produce research to meet the needs of the poor.

A programme of holistic, integrated support

In West Africa, SCARDA focused on supporting institutions within Ghana, Mali, the Democratic Republic of Congo, and The Gambia. "When they looked at institutions [to support through SCARDA], some were highly developed as centres of excellence; some were okay—they had manpower, infrastructure, but perhaps lacked political will and direction; and then others were really struggling," says Lamin Jobe, the director of research at the National Agricultural Research Institute (NARI) in Gambia. "The Gambia happened to be in the last category."

In the Gambia, SCARDA support focused on NARI, the government's agricultural research body. Visiting NARI in the present, one meets ambitious and well-trained young scientists, inexperienced yet working purposefully in key senior positions to boost the institute's effectiveness in areas such as soil science, plant breeding, and livestock management. Not too long ago, however, NARI was critically short-staffed, and many of its key programme areas were either limping along or dormant, Mr. Jobe says.

One of the key innovations of SCARDA was that the programme sought to structure its support in an integrated and holistic manner. The approach was inspired by a study of capacity within national agricultural systems, commissioned by FARA, which found that capacity-building efforts that were not "demand-driven," or in other words did not plug directly into the needs of the system, often failed. "We realized that in the past, capacity providers focused on strengthening individuals, not institutions, and that once these individuals returned to their institutions, they often couldn't function well because there was no policy environment, resources, or infrastructure in place to support them," says Ralph Von Kauffmann, the former director of capacity strengthening at FARA.

The first step of SCARDA, therefore, was to equip staff members within the focal institutes to conduct a top-to-bottom analysis of the needs, strengths, weaknesses, constraints, and priorities of their institutions. The process at NARI was eye-opening. As Mr. Jobe recalls,

at the time of SCARDA's inception, leaders of the institution were stuck: they knew that they needed to make deep changes at NARI, but were at a loss as to how to proceed.

There were so many needs: the NARS was poorly funded, and overly dependent on outside sources for research funds; the linkages between institutions such as NARI and the University of Gambia were weak; research staff throughout the country were trained to a low level; but above all, Mr. Jobe recalls, a culture of lethargy had taken root at NARI: working conditions were bad, and staff morale was low. Lacking incentives to produce good work, employees often sat idly at their desks, or took on private consulting work, collecting their salaries from NARI each month without contributing much. Mr. Jobe recalls his own frustration after returning from obtaining his MSc in entomology in the United Kingdom. He complained to the organisation's director-General: "I said, 'I haven't come back to spend eight hours a day doing nothing. I want to do research, as I've been trained to do,'" he recalls.

Initiating Transformation

With its aim of empowering institutions to deeply transform themselves at a systems level, the SCARDA programme was highly ambitious, seeking to accomplish more than may have been realistically possible in just three years, from 2007 to 2010. Nevertheless, Mr. Jobe says, the programme was a catalyst for change at NARI. All told, SCARDA support helped to begin shifting the gender balance at NARI; previously, the institute had no female programme leaders, and now it has two. The institute also transformed its accounting practices, bringing them in line with international standards, and introduced a business-winning team that has raised hundreds of thousands of dollars in consultancy income for the Institute, and also spurred new income-generation activities, such as the growing and selling of medicinal plants. The Institute has also developed new but robust research activities in areas as diverse as maize purification, fish breeding, design of equipment to process weeds into charcoal, and the manufacture of a commercial rice seeder.

Over the course of the SCARDA programme, some 143 staff members benefitted from short training programmes in areas as diverse as mentoring, leadership, marketing, research proposal writing, and financial management. Unmistakably, the most urgent need was for more trained scientists who could step into the leadership vacuum and rejuvenate research: At the time, 73 percent of the Institute's PhD holders, and 43 percent of its master's degree holders, had left their posts. "It got to a point where government was jittery," Mr. Jobe recalls. "Once you train people to that level, you can't afford to keep them. So the government began to question, why train people in first place?"

As the SCARDA scoping study and institutional analysis revealed, it was a question not only of having the right highly qualified researchers in place, but also of having an organization whose culture and structures were positioned to harness new human resources and technical expertise. During initial leadership workshops held in Ghana, Mr. Jobe and his colleagues from NARI began to explore ways of creating such a culture within NARI. "Amongst the senior management, we realized there was great need to change," he recalls. "When we came back, we gathered everybody from NARI. All the things we used to be scared of, we just put it on the table. We said, we want the institution to grow."

The areas of change included pulling mid-and junior-level staff into decision-making processes, and focusing more on developing leadership and management skills in staff members. In the past, leaders in the organisation had focused on hiring the best scientists, overlooking the fact that these scientists are often rapidly promoted to managerial positions for which they do not have the soft skills, such as managing people, that they need to be effective.

Training a New Generation of Agricultural Researchers

In the context of this broader organisational change process, SCARDA then provided funding for 10 young scientists to receive their master's training in critical areas that had been identified in the institutional analysis. "Each one was trained for a real need, so when they came back, because the system was so much in need of them, they were promoted to senior positions; and now they have a say in how the institute is run," Says Sulayman Jallow, who heads the seed lab at NARI.

Absa Jaw, an agronomist who previously worked on the cereals program at NARI, completed her MSc in plant breeding at the Kwame Nkrumah Institute of Science and Technology in Ghana, and returned to The Gambia as a trained rice breeder, equipped to help NARI begin embracing the potential of biotechnology. She completed her thesis research, which involved working to develop a rice variety resistant to the highly destructive yellow mottle virus, during an attachment at the African Rice Centre in Benin.

After returning to NARI, she was promoted as a senior research officer, coordinating all activities in rice, maize, sorghum, millet and all of the cereal grains, and responsible for coordinating all rice breeding activities in the Gambia. The training has made it possible for her to take on these new responsibilities with aplomb, while forging additional new collaborations and networks in the region, building on relationships she formed during her studies.

Now that she has returned, she continues to work hand in hand with the African Rice Centre, towards the goal of producing a variety of rice that resists the yellow mottle virus. She is working to try and introduce the gene into local maize varieties. She has meanwhile ramped up proposal writing, and also taken charge of networking with other centers in the region, such as the International Institute for Tropical Agriculture, with which NARI has begun collaborating on a program of regional maize trials.

In October, she attended a conference of the African Crops Science Society in Maputo, under SCARDA sponsorship. She has attended other international workshops on plant breeding and data analysis. Now, she says she is most excited to explore the potential of biotechnology to increase food security. Several years ago, NARI received equipment from the African Rice Centre to establish a biotechnology laboratory; but at that time the institute had no biotech specialist. It is important to use biotechnology techniques to cut down the time it takes to release new varieties for farmers, she says.

The MSc trainings supported by SCARDA were unique, in that they emphasized not only the training, but also re-integrating the students into the organisation upon their return. Because the students' training and research directly addressed the most pressing needs and gaps within NARI, they were quickly absorbed into key positions within the institution upon their return, and immediately understood the importance and relevance of their

work, says Mr. Jallow. So far, four of the 10 MSc graduates have assumed leadership roles as heads of departments and programmes at NARI.

Appropriate Technologies

Matthew Gomez, another beneficiary of the MSc training, has also returned to contribute innovative new ideas, practices and technologies to NARI. He now heads the Institute's agricultural engineering unit, which is responsible for both maintenance and upkeep of machines for NARI, and also for designing and building new products and "appropriate" technologies that can be adapted by farmers.

While studying, Mr. Gomez discovered that he had both a gift and a passion for solving problems through ingenious design. Two of his innovations, a charcoal burner and a press for processing invasive weeds into charcoal, have helped to boost regional efforts to control alien invasive species. The water hyacinth, an aquatic plant native to South America, has become a widespread problem in West Africa, choking up rivers and swallowing the cultivable areas available to farmers.

The project, now widespread across the country, enlists farmers in clearing water hyacinth from waterways. The plants are then dried, and 'carbonized' inside a large metal drum designed by Mr. Gomez, mixed with clay as a binding agent, and then compressed into briquettes. The charcoal is now sold widely throughout the region, providing an environmentally friendly source of energy in a region where many still live off the grid. The project has also allowed farmers to reclaim farmland, and has improved access to water resources; freed up land available for the development of new fisheries and aquaculture.

His work involves not only a keen understanding of mechanics and machinery, Mr. Gomez says, but also an intricate understanding of the particular needs and constraints of small-scale farmers, who often struggle to afford new technologies, and lack access to energy sources needed to power machinery. To do his job well, Mr. Gomez had to learn aspects of soil and water engineering, as well as post-harvest engineering. "I myself was a farmer; my parents are farmers—so when it comes to appropriate technologies, and farmers' needs, I know," he says.

In addition, he installed six rice mills from China, funded by the NERICA project, another example of how the strengthening of NARI's people has boosted the organisation's abilities to contribute to regional programmes. Part of his job is to modify existing technologies to make them more appropriate for local conditions—for farmers who have limited access to electrical power, for example. One of his creations, a 3-row seeder, was adapted to be drawn by animals: "Most Gambian farmers use animals, not machines," he says. "We always look at the adaptability of it by the farmers, the affordability by the farmers. If it's too expensive, then it's of no use."

The lack of access to appropriate technologies is a serious constraint for farmers, as well as the lack of skills in maintenance. "My vision is to see people trained in engineering, to make us more productive. We are doing something, but I believe we can do more," he says.

Bringing Institutions Closer Together

Support from SCARDA has also helped to solidify linkages between NARI and other organisations working within the agricultural system. The University of Gambia, for example, is located next door to NARI. Until recently, however, the two institutions had little to do with one another.

Now, the links are forming. This is in part thanks to individuals like Demba Trawally, another MSc graduate whose training in soil physics was supported by SCARDA, and who now heads NARI's soils laboratory. In addition to his work with NARI, Mr. Trawally also teaches at the university, and has been training students in practicals, hosting them in his lab to learn the techniques of soil sample analysis, and advising students on their own thesis projects.

He brought back some ideas from his own training at KNUST, such as introducing a thesis defense. Now, based on his recommendations, students writing their theses have two supervisors, and must present their work orally as well as in a written thesis. For his MSc research in Ghana, he was attached to a soils station of the Crop Resources Institute, Ghana's national agricultural research institute.*

Now back at NARI, he is increasingly working with farmers to help them analyze the qualities of their soil, and understand the relationship between soil quality and productivity on the land. The institutional analysis revealed that the institution had a critical lack of expertise in cropping systems, and no senior soil scientist at all. The issue of soil science is particularly important for the country, however, as soils are generally depleted of critical nutrients such as nitrogen, phosphorus and potassium, particularly in the upland regions of the country where the arable land, and agricultural activity, is concentrated.

"Farmers keep buying fertiliser year in and year out" without understanding the underlying causes of soil infertility, says Mr. Trawally, who studied soil physics at KNUST. Since returning, he has focused on coming up with cost-effective strategies and technologies for improving soil quality and fertility for farmers. Before his training, he says, he never fully understood how to use scientific methodologies to test hypotheses and design problem-solving approaches. "We go around and collect soil samples and analyze them... we look at the nutrient status of plants and soils, and advise farmers," he says.

Already, his expertise has produced tangible results for the Institute and the country. When farmers raised complaints about the quality of a $3 million consignment of fertiliser purchased by the government, Mr. Trawally was able to conduct a crop study in order to determine the efficacy of the fertiliser. He planted selections of fast-growing maize using the fertiliser alongside sections of maize to which he applied normal fertiliser, in order to

demonstrate the deficiencies of the product. In the past, the government would have had to send the fertiliser for testing outside of the country for analysis, but with his new skills Mr. Trawally was able to conduct the tests himself, under the supervision of the Director-General. Currently, his work is being used to arbitrate a settlement between the government and the supplier, which will save the government both time and money.

In the future, Mr. Trawally wants to work more closely with the country's agricultural extension system to educate farmers about soil. "I see the lab coming closer to the farmers," he says. "We can build the capacity of farmers to use their own test kits to analyze their own soil."

A Business-winning Team

For Mama Miriama Saho, completing an MSc in food safety at the University of Greenwich offered the opportunity to contribute new knowledge to a field that is only now beginning to emerge in The Gambia. Like her colleagues, she says she has gained skills and confidence, and has already contributed to the country's agricultural research system in ways she would not have been able to before. She represented NARI, for example, as part of a team developing a national food safety bill, and also contributed in the preliminary planning process for establishing a national food safety agency.

Through her training, Ms. Saho says, she has been sensitized to food safety issues that she could not grasp before, such as the sanitary conditions of abattoirs, and safe practices for handling meat. "There are certain health problems we see that are related to food safety that nobody realizes," she says. She believes, for example, that certain food-borne diseases like salmonella are often mis-diagnosed as malaria, simply because people are unaware of them.

Ms. Saho, who previously worked in the livestock research component of NARI, had experience in extension, working for the department of veterinary services, now is head of livestock at NARI. In addition, she has taken over as the chair of the business-winning team, which has so far succeeded in racking up two consultancies, including a regional project, funded by Aus Aid, the Australian aid agency, which involves promoting the integration of crop farming and livestock husbandry amongst small-scale farmers. Ms. Saho is coordinating the Gambian segment of the programme—a further example of how SCARDA support has helped NARI to position itself to take advantage of consulting, networking, and regional collaborative research that will only contribute towards strengthening its capacity in future.

Now, as The Gambia begins to transition from subsistence to commercial agriculture in order to grow and strengthen its economy, says Mr. Jallow, NARI is now in a better position than it used to be to support and contribute to this process. What is needed now, he says, is further investment in strengthening the leadership and management abilities of the new generation of researchers.