

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

Discussion Paper 2

**An analysis of the capacity strengthening process and
short term outcomes in the SCARDA project: The case
of Agricultural Research Corporation (ARC) Sudan**



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Acronyms

AICM	Agricultural information and communication management
ARC	Agricultural Research Corporation, Sudan
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAADP	Comprehensive Africa Agriculture Development Programme
CORAF/WECARD	West and Central African Council for Agricultural Research and Development
DFID	Department for International Development, UK
ECA	East and Central Africa
FARA	Forum for Agricultural Research in Africa
FI	Focal institution
IPM	Integrated pest management
ISABU	Institut des Sciences Agronomiques du Burundi
ISAR	Institut des Sciences Agronomiques du Rwanda
MSc	Master of Science
NARS	Agricultural Research Systems
NGO	Non-government organization
NRI	Natural Resources Institute, UK
PICOTEAM	Institute for People, Innovation and Change in Organizations
PLG	Peer learning group
RUFORUM	Regional Universities Forum for Capacity Strengthening in Agriculture
SADC-FANR	Southern African Development Community – Food and Natural Resources Directorate
SCARDA	Strengthening Capacity for Agricultural Research and Development in Africa
SRO	Sub-regional organization

1. Summary

This paper is a case study of capacity strengthening activities carried out at the Agricultural Research Corporation in Sudan between July 2008 and March 2011. These activities were undertaken through the project 'Strengthening Capacity for Agricultural Research and Development (SCARDA)' which was implemented in the East and Central Africa region by the Association for Strengthening Agricultural Research in East and Central Africa. The paper describes the identification of capacity needs and the design and implementation of interventions aimed at enhancing the performance of ARC and strengthening its links with partner organizations. A combination of training workshops, mentoring, short courses, long-term postgraduate training and work-based experiential learning was used to address a set of priority needs. The training was placed in an organizational change context and guided by a learning framework. The hypothesis was that the acquisition by key staff of a set of core competencies would lead to a change of mindset among staff which would begin to enhance organizational performance.

An analysis of the short term outcomes of the capacity strengthening process, based largely on discussions with ARC staff, shows that beneficial change in the organization has started. Managers and senior researchers have introduced new methods, including the use of management tools such as feedback, into their working practices. Improved communication and team work has resulted from project activities and staff have begun to focus more on strategic issues affecting the organization. New multi-stakeholder partnerships have been formed, largely through a set of 'peer learning groups' that were established with the support of the project. These partnerships had the additional advantage of drawing in new sources of funding at a time when the organization's budget was under severe pressure.

The analysis also revealed that these early beneficial outcomes are fragile and may not be sustainable unless ARC takes further action to institutionalize the improved working practices within the organization. The challenge for ARC is to find a way to mainstream capacity strengthening within its core activities, and at the same time allocate scarce resources to other priority programmes.

Key words: Capacity strengthening, needs assessment, change management, organizational development, mentoring, agriculture, peer learning.

2. Background

2.1. About SCARDA

In 2005, the Forum for Agricultural Research in Africa (FARA) in collaboration with the three sub-regional agricultural research organizations (SROs) in sub-Saharan Africa (ASARECA, SADC-FANR and CORAF/ WECARD) conducted an assessment of national agricultural research systems (NARS) in 26 African countries. The aim of the study was to determine ways in which support could be provided to improve research performance in the continent. The assessment identified grave weaknesses in the capacity of the NARS to conduct and manage agricultural research (FARA, 2006). Consequently, the project on Strengthening Agricultural Research and Development in Africa (SCARDA) was conceived with the purpose of strengthening 'the human and institutional capacity to ensure that the NARS are better able to identify generate and deliver research outputs that meet the needs of the poor'. SCARDA was intended to pilot a new integrated and holistic approach (dubbed the 'SCARDA Approach') to institutional and human capacity strengthening involving 12 Focal Institutions (FI) and their key NARS partners from 10 African countries spread across the three sub-regions of sub-Saharan Africa (FARA, 2011).

In the East and Central Africa (ECA) sub-region, SCARDA targeted three NARS represented by Institut des Sciences Agronomiques du Burundi (ISABU), Institut des Sciences Agronomiques du Rwanda (ISAR) and the Agricultural Research Corporation (ARC) in Sudan as the FI. Coordination was provided by ASARECA with support from the Regional Universities Forum for Capacity Strengthening in Agriculture (RUFORUM).

The expected outputs from SCARDA investment were:

1. Agricultural research management systems and managerial competencies to conduct high quality research strengthened in participating NARS;
2. The capacity of participating NARS to undertake quality integrated agricultural research for development strengthened;
3. The relevance of training programmes in agricultural universities to current market demand established;
4. SCARDA approach for capacity strengthening is validated.

SCARDA operated over a relatively short time period, from February 2007 to March 2011, and some of the activities were carried out very close to the end of the project. This limited the time available for reflection and for documentation of the main outcomes arising from the implementation of the various capacity strengthening interventions. Consequently, a further nine-month period of support was provided by the donor agency, the Department for International Development (DFID) of the United Kingdom, to identify and document the approaches used and the outcomes which resulted. This serves both to consolidate learning among the partner organizations and to enable project findings to be disseminated more widely. One mechanism for sharing information is an electronic platform which facilitates access to key reports and resource materials. The platform also provides an opportunity for networking and for exchanges of ideas and experience through a set of online communication tools. The platform is hosted on the website of the Regional Forum for Capacity Building in Agriculture (RUFORUM) and can be accessed at <http://ruforum.org/a/scain>.

2.1.1 About the Agricultural Research Corporation (ARC Sudan)

In Sudan, SCARDA support was primarily directed towards strengthening the capacity of the Agricultural Research Corporation (ARC). ARC is a national agricultural institute, with the mandate of undertaking applied agricultural research on food and industrial crops, forestry, livestock and food technology. The institute is expected to develop sustainable production systems for different agro-ecological zones and regions in Sudan. It has a long history dating back to nearly one century ago, and as would be expected of such a public institution, it has undergone many stages of administrative re-structuring and re-organization. Until 1967 when it became a semi-autonomous organization, ARC existed as a research unit in the Ministry of Agriculture. In 2001, alongside other research institutions in the country, it was placed under the umbrella of the Ministry of Science and Technology. This situation changed again in 2010 when the institute reverted back to the Ministry of Agriculture.

ARC delivers its mandate through a network of 23 research stations and eight commodity based research centers that are located in different corners across major agricultural production areas and agro-ecological zones. These stations and centers are manned by a total of nearly 500 research staff and nearly three thousand support staff (Figure 1).

2.2 Objectives and approach of the case study

2.2.1 Objectives

The overall objective of the case study of ARC in Sudan was to document the application of the capacity strengthening approach applied through SCARDA and identify whether any beneficial outcomes have resulted. It is anticipated that the findings will inform continued efforts to improve performance in the organization. It is also hoped that they will be of interest to other agricultural research and education organizations in the region.

The specific objectives of the case study were to:

1. Describe the situation at ARC before SCARDA began – what was working well, what was not working well and what needed to be changed.
2. Outline the process that was used in the diagnostic phase to design interventions.
3. Summarise the changes that were identified as priorities in the action plan.
4. Assess the activities and outcomes of the change process – what was actually done and how, what has been successful, what has not been successful, and what now needs to be done.
5. Determine ARC's future plans to continue the process of organizational change.

Support for capacity strengthening under SCARDA in the ECA sub-region involved a combination of activities specific to each FI and joint activities which involved participants from each of the three target countries. Both types of activity will be briefly described, but discussion of the outcomes will be restricted to those relating to ARC. The emphasis of the case study is on how capacity strengthening has contributed to organizational change as this was a major aim of the project. This is also the focus of similar case studies which have been carried out on SCARDA activities in The Gambia and Lesotho (Kannae et al., 2011; Pound et al., 2011). A synthesis of change management activities carried out under SCARDA, which draws on the findings of the three case studies, has also been done



Figure 1: Locations of Research Centers and Research Stations.

(Orchard, 2011). Each of the reports is available online on the electronic platform hosted by RUFORUM.

2.2.2. Approach

A team was established comprising an organizational development specialist, a senior ARC manager and capacity strengthening specialists from ASARECA and the Natural Resources Institute. The team conducted:

1. A review of relevant documents including diagnostic, training and progress reports.
2. Interviews with individuals, some of whom later provided written testimonies of their experiences in participating in capacity strengthening activities and applying their newly-acquired skills. Focus group interviews with managers and students at ARC who have participated in SCARDA. Elements of the “soft laddering approach” to assessing changes in attitudes and values of brands and products in marketing research were employed (Zanioli & Naspetti, 2002). Staff were asked to identify significant changes in the organization which could be attributed to SCARDA interventions.
3. A workshop held in September 2011 at ARC with a cross-section of staff to define the outcomes of SCARDA, to identify lessons and to discuss future plans. Participants analysed the situation at ARC before and after SCARDA interventions and identified beneficial outcomes and challenges that were faced.
4. A meeting with the Director General of ARC to share findings from the activities in steps 1-3 and to explore ways for recommendations on future actions to be implemented.

3. Identification of capacity strengthening needs and design of interventions

3.1. Scoping study

An initial scoping study of capacity needs at ARC was conducted by two local consultants in August 2007 (Dukheri & Elamin, 2007). A key finding was that ARC was aware of the need for a strategy to enable it to respond to the changing internal and external environment. The 5-year National Plan of 2007-2011 and the Agricultural Revival Plan make provision for the promotion of agricultural research. But ARC's annual budget was low, infrastructure in many of the research stations was degraded, and there was an imbalance in the allocation of scarce resources among disciplines. Areas such as plant breeding and food technology needed to be developed rapidly to meet emerging needs. ARC had recruited a sizeable number of young staff members since 2005, but this was due to be counter-balanced by a similar number of retirees.

ARC senior managers realized that more training was needed for younger staff, especially in new areas such as biotechnology and information management. They also appreciated that some of the management functions such as planning, monitoring and evaluation and impact assessment were weak. ARC was already engaged in impact-oriented participatory research, largely through initiatives supported by overseas donors. But it was not systematically evaluating the impact of its work or mainstreaming wider research partnerships within its core activities. SCARDA would provide an opportunity for ARC to strengthen these areas whilst at the same time reviewing its overall strategic objectives.

3.2. Needs assessment and programme design

Following the submission of the scoping study report, ASARECA decided to include ARC as one of the three FI to be supported through SCARDA. Although the implementation phase of the project formally started in January 2008, there was a delay of several months before activities began (see Table 4 in Annex 1). In July 2008, a three-person team appointed by ASARECA visited ARC to review with managers and staff the main findings of the scoping study and design the implementation strategy (Okoriet al., 2008). This was done through meetings with managers and senior scientists at the ARC headquarters in Wad Medani. A visit was also made to the University of Kordofan which it was envisaged would participate in selected activities as a key partner organization of ARC.

As a result of the discussions, it was agreed that support for research management, addressing Output 1 of the project, would be targeted at programme leaders, deans and heads of department and that activities would be largely conducted in Sudan. It was further agreed that interventions to enhance research quality (Output 2) would include MSc studentships, technician training and short courses. The priority topics for the MSc studentships were defined by ARC and it was decided that selected students in plant breeding, information and communication management and rangeland management would be placed at universities in other countries in the region where specialist knowledge is available. The remaining students would register at ARC which runs its own Masters programmes in association with the Sudan Academy of Sciences. An important component of the support to students would be mentoring. ARC staff would act as mentors to students and guidance would be provided by an external service provider.

With regard to strengthening the skills of technicians it was agreed that this would be done as a regional course, but that the content would reflect the needs and interests of each of the FI. ARC identified integrated pest management as the priority topic for upgrading the skills of scientific staff through a short course. This was related to concerns about the over-use of pesticides on the Gezira irrigation scheme and the resulting difficulties in managing certain pests, weeds and diseases (UNEP, 2007). ARC also wanted to enhance the capacity of its staff in monitoring and evaluation. As this was a priority of the FI in Burundi and Rwanda provision was made for a regional course to be conducted in planning, monitoring and evaluation.

ASARECA, through a competitive process, commissioned service providers to work with the FI to enhance capacities in research management and research quality, respectively. The Institute for People Innovation and Change in Organizations (PICOTEAM) was contracted by ASARECA to enhance agricultural research management capacity and lead on mentoring and coaching activities. The National Crops Resources Research Institute (NACRRI) in Uganda, was appointed to conduct technician training. Training in integrated pest management and planning, monitoring and evaluation was provided by the Natural Resources Institute, UK.

The SCARDA approach involved developing a holistic package of interventions addressing priority capacity needs which would collectively contribute to enhanced organizational performance. A change management strategy was developed in the project to guide the application of this approach as it was recognized that changes in attitude, practices and systems may be needed to improve organizational performance (Taabazing, 2009; Orchard, 2011). It was considered that the most appropriate way of coordinating the

organizational change process was through the design of a comprehensive approach to improving research management. Therefore, at ARC the final stage of the needs assessment and programme design was led by PICOTEAM through a workshop with ARC staff that was held in September 2009.

PICOTEAM identified that ARC managers and research staff held a rather traditional view that participation in individual training courses would be sufficient to develop organizational capacity. PICOTEAM proposed that participants in the leadership and management training would learn specific principles, but that skills would be developed through applying them in their own working environment. Mentoring and coaching would be used to help strengthen the capacities of early career personnel, but would have wider application in the overall management of research activities. It was felt that this systemic approach required that most of the activities should be carried out in-country, as opposed to a regional level with ISABU and ISAR. This approach was also considered more likely to engage senior managers in the change process as their participation in activities outside the country could not be guaranteed. Taking into account the resources available it was agreed that there would be two Learning workshops on leadership, management and mentoring and a separate mentoring orientation workshop. Provision was made for a regional workshop at the end of the period to consolidate learning at the regional level.

4. Implementation of capacity strengthening activities

The approach adopted by PICOTEAM to facilitate beneficial change in ARC focused on expanding the roles of agricultural researchers to include facilitation and networking; improving the competences of agricultural research managers; and facilitating the development of partnerships through appropriate institutional arrangements. The mechanisms for implementing this approach are described below together with the complementary interventions on mentoring, MSc training and short course provision.

4.1. Improving leadership and management capacity

To improve leadership and management capacity at ARC, PICOTEAM provided guidance on improving five key competence areas. These competence areas were facilitation for change; managing research for development and quality of science; facilitating partnerships and institutional arrangements for impact; managing units, teams and organizations and; managing self development for leadership (Figure 2). The hypothesis was that, by obtaining a level of proficiency in these areas the overall performance of leaders and managers would be improved. The five competency areas may be briefly summarized:

1. Facilitation for change: this was defined as the process through which teams are provided with space for, and helped to do, their own best thinking that leads to problem solving. From PICOTEAM's experience, this is one of the most effective vehicles for a change management process (Hagmann et al., 2009). ARC staff were exposed to, inter alia, the following.

- Concepts and methods in the design of successful facilitation processes.
- Organizational development and change management principles and values.

2 Managing research for development and quality of science: the main topic covered was proposal development, although a number of other key areas such as priority setting and project cycle management were proposed by ARC staff as topics to be included.

3. Facilitating partnerships and innovation platforms for impact: A number of topics were proposed, however, the main area covered was how to develop a “win-win” partnership arrangement. Different approaches and models for negotiation were covered in detail.

4. Managing self development for leadership: This area was covered with a greater degree of detail both in depth and breath. In particular, there was detailed and iterative coverage of topics such as personal mastery and soft skills; developing the right attitudes, mindset and self-positioning; principles and practice of effective communication; and becoming an effective team player.

5. Managing organizations / units / teams: Emphasis was placed on orientating the individual to the key principles of organizational management. Concepts, styles and approaches to leadership and management were covered and there was a strong focus on approaches to catalyzing team/unit productivity.



Figure 2. PICOTEAM's competency-based approach to learning”.

Capacity strengthening in the five competency areas was provided through the three learning workshops describe in Section 3.2. During these workshops, the participants reflected on the functionality of their research management systems, and identified areas of improvement and the specific actions required to address the challenges. The participants were also exposed to a number of approaches to improving management and leadership competency. Employing some elements of the appreciative learning approach, participants were exposed to real life situations to illustrate the application of theory (Cooperrider *et al.*, 2008). During the first learning workshop, participants formed nine peer learning

groups consisting of individuals who work and learn together whilst addressing issues of common interest. These were organized around geographical clusters of research stations to address local issues and facilitate logistics.

An example of a peer learning group is one that was formed between members of the five ARC research stations in Sinnar, White Nile and Blue Nile States. The primary objective of the group is to enhance the adoption of new technologies by farmers and to strengthen their skills through seminars, field days and farmers schools. Additional aims are to promote a healthy environment through the use of safe agricultural practices and to facilitate improved coordination of activities among group members. A budget was allocated to support the functioning of the group and work plans developed for a two-year period ending in December 2012.

Activities and results of peer learning group activities were reviewed at subsequent workshops. A total of 45 staff members, five of whom were women, participated in the first workshop which was held in February 2010 (Table 4, Annex 1). There was a large gap until the second workshop which was held in February 2011 and attended by 35 staff members, seven of whom were women. The long period between the first and second workshops was not foreseen and was due to delays in the transfer of funds to project partners. Ten staff members, two of whom were women, attended the regional learning workshop in Nairobi in March 2011.

4.2. Inculcating a mentoring culture in ARC

During the first learning workshop, researchers in the early stages of their careers, including SCARDA-sponsored MSc students, were asked to identify potential mentors and approach them to ensure that they would be willing to fulfill this role. A mentoring orientation workshop was then organized for mentors and mentees to introduce the principles of mentoring and coaching in organizations, and to identify or confirm specific mentoring and coaching challenges for each organization. Although mentoring had been taking place in ARC, this was being done informally and without a clear framework or guidance on good practice. The workshops were also used for mentors to exchange their profiles and identify the professional desires of the mentees.

A total of 16 mentees received mentoring during the project period, the majority of whom (13) were men. Mentors and mentees signed formal contracts which set out the objectives and scope of their interaction. Planned activities included regular meetings which might involve specific activities such as coaching and assistance with proposal writing as well as general guidance on a range of issues. Mentors and mentees reviewed their experiences during the second leadership and management workshop.

4.3. MSc. training

In August 2008, fifteen students from ARC and partner organizations were selected for participation in MSc programmes in Sudan, Kenya and Uganda (Table 5, Annex 2). Registration began immediately, but was delayed in some cases for logistical reasons. Delays in the transfer of project funds caused some disruption to the students registered at universities in Kenya and Uganda, but they were all able to graduate successfully. RUFORUM arranged additional courses for the students studying overseas on proposal

writing, scientific data management and personal mastery and soft skills. Further details on the MSc training are provided in a separate paper (Ekaya *et al.*, 2011).

4.4. Short courses

A regional workshop on Planning, Monitoring & Evaluation was held in Kigali, Rwanda in January 2009. A total of five ARC managers and senior researchers participated, all of whom were men. The aim of the course was to strengthen the participants' understanding and skills in communication, planning, monitoring and evaluation with regard to agricultural research for development. During the workshop, participants developed action plans for applying in their own working environments. However, a plan for a subsequent project-wide Monitoring and Evaluation workshop was not implemented and so there was not follow-up on the action plans.

A training workshop on integrated pest management was held in January 2010 in Wad Medani in Sudan. A total of 17 women and 10 men from ARC and partner organizations took part in the training. The course covered key areas relating to the identification and management of insects, diseases and weeds. The emphasis was on the development and use of environmentally sustainable pest management practices and on minimizing health hazards associated with the use of pesticides.

The upgrading of skills in laboratory management was conducted through two rounds of regional training in which a total of 16 ARC staff participated. Each round was delivered in a period of two weeks by the National Crop Resources Research Institute in Uganda. The topics covered were: best laboratory management practices, clean seed production including aspects of quality control, seed certification, seed legislation and marketing, principles and domains of research ethics, plant disease diagnostics and data management.

As with the research management and mentoring workshops, participant's evaluations were done after each of the training workshops and these showed high levels of satisfaction. However, feedback gathered during a workshop with a sample of 16 ARC staff members who had participated in the training workshops also revealed a common view that further courses were needed to maximize the benefit of the training (see Table 4, Annex 1). In the case of the integrated pest management training, senior researchers believe there is scope for ARC to become a regional centre of excellence and that subsequent support should help to facilitate this.

5. Initial situation at ARC and mid-term assessment of benefits

Information on the situation at the start of SCARDA was collected during the scoping study and in the discussions at ARC on capacity needs and programme design. Additional information was gathered after the start of the capacity strengthening activities in two ways. In February 2010 a questionnaire was completed by the staff member at ARC with lead responsibility for SCARDA. There was broad agreement amongst ARC staff on the situation at the start of the SCARDA project in 2008 and this may be summarized as follows. ARC had no clear strategy and was ill-prepared to meet the emerging challenges facing agricultural development in the country. Scientific capacity in certain areas such as the application of biotechnology to plant breeding was weak and needed to be strengthened. Infrastructure had become degraded and the annual budget allocation from the government was not sufficient to maintain buildings and equipment. There

were deficiencies in important management functions. Areas in which improvements were required included strategic planning; monitoring and evaluation and impact assessment; internal and external communication; working in teams; and forging partnerships with other organizations, especially agricultural extension services and the private sector.

ARC also had strengths upon which to build; notably, a large complement of skilled staff including a group of young recruits who had joined the organization since 2005. But these younger staff required further skills to be effective and they needed to be motivated to work at locations areas where the needs are greatest. To make progress in these areas, a stronger focus on resource mobilization would be essential. It would not be possible for a relatively small, time-bound initiative such as SCARDA to address all of these issues. However, it was envisaged that SCARDA could act as a catalyst for beneficial change by working with staff to develop their skills in key areas and identify ways in which the performance of ARC could be enhanced. Consequently, ARC managers and PICOTEAM agreed that three main outcomes would guide the approach to change management.

1. Enhanced responsiveness and commitment of purpose by managers (including through introducing business thinking and practice).
2. Greater 'big picture thinking', including ability to identify, analyze and harness opportunities and challenges traditionally not captured in 'project thinking'.
 - a. Sharper focus on outcomes and impacts (not just activities and outputs).
 - b. Value-based, results-focused, goal-setting.
3. Increased proactive management of multi-stakeholder arrangements through facilitating project/program development and implementation processes and using these as platforms to strengthen (project design and implementation) capacities of researchers and research managers.

A 'mid-term' employee survey conducted in March 2010, one month after the first leadership and management workshop, provided an opportunity to assess whether ARC staff perceived that early project interventions were bringing benefits. Eight of the 16 staff members in the survey were technicians who had attended the laboratory management or integrated pest management courses. The majority of the other staff members were researchers, four of whom were in senior management positions and had participated in the leadership and management training. Most (14) of the staff had been involved in mentoring either as mentors or mentees. There were equal numbers of men and women and 11 of the staff had been employees at ARC for at least five years.

Without reference to the baseline data or expected outcomes, employees were asked to recall the major weaknesses at the start of the project in 2008 and to identify any benefits that had resulted. The results are summarized in Table 1 and show that staff believed that new skills had been acquired and changes in working practices had begun.

When asked to comment on the capacity strengthening activities they were involved in, all but one of the respondents said they were satisfied or very satisfied with the training provided. A similar number strongly agreed or agreed with the statement that there had been 'Improved performance of research and technical staff'. However, many staff commented on the need for further training. With regard to mentoring, some staff proposed that there should be follow-up meetings to facilitate the expansion of the process beyond the initial group. Fifteen of the 16 respondents strongly agreed or agreed that there had

been “Improved performance of at least one management system”. The responses indicate that there was a positive feeling among staff who had been involved in SCARDA activities that beneficial change had begun. They also highlight concerns about the need to build on what had been done, especially in relation to institutionalizing the mentoring approach.

6. Establishing the outcomes of SCARDA intervention

Typically, the effect of project outputs on target beneficiaries, herein referred to as outcomes, takes time to manifest in a visible and measurable form. As SCARDA activities in ARC were interrupted for long periods in 2009 and 2010, consolidation of the learning process and opportunities for putting into practice the acquired knowledge and skills are likely to have been missed. This complicates the task of identifying the immediate outcomes of SCARDA, following a well defined theory of change. Nevertheless, information gathered during the learning workshops held towards the end of the project, supplemented by the

Table 1: Perceived early benefits from SCARDA activities (March 2010)

Weaknesses at the start of SCARDA ¹	Benefits already seen
Lack of a strategy (2 responses)	Agreement to revisit the strategy The shift to being strategic and analytical in thinking
Human resources (2)	Workshop on better management of research project Knowledge and information
Communication (2)	Stronger relationships with colleagues Team work better
Facilitation of processes and delegation of authority	Ability to provide good feedback
Quality of leadership is transactive not creative (2)	Skills acquired allowing research managers to become more creative Staff demand for a different style of management
Writing competitive proposals	Change has started
Scientists working individually (2)	Improved and increased knowledge by working in groups Better team work
Links with farmers and priority setting	Increased knowledge of IPM

¹ Responses of ARC staff members to a questionnaire administered during a workshop in Wad Medani

views of participants in the September 2011 workshop, provides an indication of the effects of the capacity strengthening interventions.

PICOTEAM believed that the most effective way to enhance the performance of ARC as a research organization was to develop the competencies of key staff within an organizational change agenda. They recognized that there were some highly motivated individuals among the managers and scientists with the requisite enthusiasm to stimulate the process of change 'from within.' Senior managers and many research staff were initially sceptical about the proposed approach, but after further discussion they became aware of the potential benefits of opening up the organization to self-diagnosis and reflection. They also recognized that empowering scientists and managers with partnership and resource mobilization skills would open new opportunities for accessing additional resources and growth. This was particularly important at a time when the budget allocation from the government was under pressure and there was limited external funding coming into the system.

6.1. Changes at ARC during the implementation of SCARDA

Following the two learning workshops conducted by PICOTEAM, staff of ARC went through a reflection process to identify the effects of the SCARDA programme on their performance. The third joint learning workshop provided a platform for taking stock of achievements and lessons learnt. During the workshop, participants identified key changes that had occurred in their organizations during the implementation of SCARDA. ARC staff identified five major changes which were:

1. Transfer of ARC back to the Ministry of Agriculture from the Ministry of Science and Technology in 2010
2. Development of a new draft strategy for ARC that began in 2007
3. Restructuring of ARC in 2010, resulting in 4 new directorates
 - o Research Programmes and International Relationships
 - o Human Resource and Information
 - o Administration and Finance
 - o Technology Transfer and Agricultural extension
4. Strengthening the public and private partnerships
5. Establishment of the planning, monitoring and evaluation function

During the September 2011 workshop, staff were asked to identify the possible drivers for these changes. Of significance was the realization that whilst being placed within the Ministry of Science and Technology had the immediate benefit of improving the quality of research, for example through an increase in the number of peer reviewed publications, the target beneficiaries of research outputs such as the extension services and the farming community had less than optimal levels of interaction with ARC. The Ministry of Agriculture on the other hand, was responsible for, inter alia, the extension services - a department with a wide network of frontline staff. Transferring ARC back to the Ministry of Agriculture would therefore bring it closer to the primary target beneficiaries of research outputs. This would help to ensure that the research would be more responsive to national priorities and the needs of small farmers.

The transfer of ARC to the Ministry of Agriculture was not attributable to SCARDA, but the internal lesson learning from the project helped to inform the restructuring process in various ways. ARC staff cited better management, improved performance and better engagement with stakeholders as some of the likely outcomes of restructuring. The development of a new draft strategy provided ARC with an opportunity to respond to the emerging global and regional trends as well as aligning with national objectives. Many African governments are putting in place programmes aimed at responding to the Maputo Declaration of 2003 that led to the establishment of the Comprehensive Africa Agriculture Development Programme (CAADP). Moreover, discussions on strategic priorities revealed that emerging threats such as climate change and the changing political dynamics within Sudan provide a compelling case for a new strategic orientation for ARC.

The creation of a directorate in charge of technology transfer provides an opportunity for enhancing both the uptake of research outputs and the feedback mechanism on possible outcomes and impacts of ARC investments. ARC staff were empowered during the workshops on how to interface with the end-users and build partnerships involving research, extension, non-government organizations and the private sector for moving promising technologies to farmers and for enabling them to engage in markets profitably. This became clear during the third learning workshop in Nairobi, when participants reported how the skills and tools they had acquired during the leadership and management training were helping both to strengthen research-extension-farmer linkages and to involve research staff in decision making processes.

6.2. Outcomes attributed to SCARDA interventions

"Practical example with implementation of constructive feedback between my staff, this positively reflected in their outputs and their improved skills and creating competitive and friendly working environment. Feedback is also adopted by myself as the Director of Land and water research Centre through timely reporting to the DG" (one of ARC Directors)

Participants in the consultative workshop held in September 2011 identified the key changes arising from the SCARDA capacity strengthening interventions. Their observations are consistent with those made during the mid-term employee survey. They also appear to support PICOTEAM's belief that the acquisition of new skills within a learning framework would lead to mindset change. At the start of the project staff were reluctant to identify specific actions to address the challenges faced by ARC. By contrast, in September 2011 researchers and managers held definite views on how to advance the development of the new strategy. The participants also confirmed that the reforms in ARC have provided more opportunities to better respond to the changing demands from their clients. Specific areas of improvement by component are summarized in Tables 2 and 3.

The MSc training was viewed as especially valuable by ARC management. Students studying plant breeding overseas were able to utilize advanced laboratory facilities such as those at the Biosciences Eastern and Central Africa hub in Nairobi. This enabled them to become familiar with new molecular techniques that they have applied to the improvement of priority crops at ARC such as sorghum. The students were given the opportunity to present posters and papers at the RUFORUM bi-annual conference in Entebbe in September 2010 and the African Crop Science Conference in Mozambique in October 2011. This international exposure has helped them to develop networks with researchers from other countries in their areas of expertise. These linkages, together with

Table 2: Staff testimonials on improvements arising from the leadership and management training at ARC (September 2011)

Situation before training	Situation after training
<ul style="list-style-type: none"> • Participation was weak. • Interaction between old and new generation was weak. • Delegation of power was very weak. • Coaching and mentoring were nil (specified for training example, MSc and PhD). • Feed back as a tool was unknown. • Partnership was not common. • Negotiation and its tools (win- win, lose- win and lose- lose) specified. • Collaboration of ARC scientist and others stakeholders was weak. • Limited social relationship with in this group. • Generally training in ARC was not enough. • Research for development was not satisfactorily practiced in ARC. • Poor administration experiences. • Poor team work collaboration • Narrow sense orientation (thinking within the box). • Poor linkage with other stakeholders and policy makers. • Limited competitive grants from regional (org. limited Regional Interaction). • Limited capacity building programs • Poor communication between stations. 	<ul style="list-style-type: none"> • Improved participation. • Interaction now is better. • Delegation is common. • Coaching and mentoring process is practiced. • Feedback as tool used by many among us • Partnership is very common. • Negotiation and its tools is becoming very common language. • Collaboration of ARC scientist and other stake holders become strong. • Social relationship with in this group is strong. • 10-SCARDA trained fourteen of ARC students and got exposed- interacted with others • We got exposed research for development for improving livelihood • Understanding the Concepts of management leadership coaching and mentoring, partnership, etc. • Thinking, motivating and accepting change. • Raising the awareness of the strategic plan and the restructure (ARC). • Adoption of mentoring and coaching approach. • Improved capacity building (Long M.Sc. and short courses. • Facilitate interaction bet seniors and early career Scientists. • Successful stories of Peer Learning Groups. • Improved Social Interaction. Adoption of Facilitation.

Table 3: Testimonials of ARC staff on the effects of each of the SCARDA components (September 2011)

SCARDA Component	Perceived positive changes after intervention
Change management	<p>“SCARDA equipped the participants to use the tools process to catalyze the change management. Change management elements diffuse gradually through ARC members; includes: improved delegation, participation, feedback, mentoring and coaching, leadership and time management, interaction and communication, facilitation. The process also initiated the establishment of a monitoring and evaluation unit in ARC.”</p> <p>“SCARDA equipped the participants to use the tools process to catalyze the change management. As a result of this exposure, most of the staff can now effectively delegate.”</p> <p>“Mentoring is part of the Sudanese culture from the start by nature. What had been practiced in ARC is mostly coaching and rarely mentoring. Now there is a slight shift towards making mentoring concept as culture. The SCARDA learning workshops unveil the mentoring concept and bring it to the front. Finally, the now mentees are potentially mentors for coming generations and hence enhance the practice towards widely spreading the concept of mentoring.”</p>
Short term technician training	<p>“Included technician trainings (IPM and laboratory operation). These trainings courses upgrade our technician’s skills to be used in lab analyses and crop protection measures. For example they gained different types of laboratory skills, moral promotion, motivation and exchange experiences with other technicians from Rwandese and Burundian NARS.”</p>
Long term MSc. training	<p>“Has had a positive impact on the ARC performance. For example; 35% of the MSc. students finished their projects and two of them continued their PhD studies.¹ The rest of the students are about to finish their thesis. The graduate students will become active researchers and will strengthen and contribute to the ARC capacity innovation.”</p> <p>¹ These are the five students who studies overseas.</p>

training in proposal writing which was coordinated by RUFORUM, have already resulted in new project funding. For example, two students have been successful in obtaining funding from the Alliance for a Green Revolution in Africa to support research in South Sudan where they are now working.

Box 1 illustrates how ARC staff in some of the research stations have successfully applied knowledge and skills acquired during the training related to the facilitation of partnerships and innovation platforms for enhanced impact. The peer learning group in North Kordofan has strengthened its relationship with the State Agricultural Ministry and also linked with other partners to establish an innovation platform on community-based seed production. In so doing, the group has been able to bring additional resources to support their activities and strengthen their outreach work with local partners.

Another peer learning group was formed between members of the five ARC research stations in Sinnar, White Nile and Blue Nile States. The primary objective of the group is to enhance the adoption of new technologies by farmers and to strengthen their skills through seminars, field days and farmers schools. Additional aims are to promote a healthy environment through the use of safe agricultural practices and to facilitate improved coordination of activities among group members. A budget was allocated to support the functioning of the group and work plans developed for a two-year the period ending in December 2012.

Box 1. New partnerships in North Korodfan

“Before SCARDA, our Station informally collaborated with the State Ministry of Agriculture and Animal Wealth, development projects and NGOs in North Kordofan state and hence technology transfer to the target beneficiaries who are generally smallholder farmers was improperly articulated among stakeholders which resulted in poor adoption of agricultural technologies.

The need for partnership and strategic alliance was clearly demonstrated and brought to surface as a tool for enhancing adoption and inducing change through win-win approach. Memorandum of understanding between the State Ministry of Agriculture and Animal Wealth was developed and signed. Our station gained political (advocacy for state financial support) and logistical support (four tractors) from the State Minister and at the same the technical backstopping from researchers in the station could enhance dissemination of technologies through demonstration farms carefully selected in each local council for this purpose.

Recently, an innovation platform for community based seed production of improved crop varieties has been established. Partners like IFAD, Elobeid Research station, Ministry of Agriculture and Animal Wealth, private seed company, and Farmers union were facilitated to serve in the proposed innovation platform to be functional next season.

So far 40 researchers (15%) from ARC participated in SCARDA learning workshops. There is a general believe among participants that the learning workshops at least tuned the minds towards accepting change, hence, there is a need to continue this initiative to involve more participants from ARC and other stakeholders to mobilize them for change.”
Director of the ARC Elobeid Research Station, September 2011

However, not all of the peer learning groups have been active and several challenges have been identified. In particular, limited funds have been allocated to their activities. The large distances between some of the research stations means that travel is time-consuming and costly. This limitation could be overcome, in part, by online communication but the facilities for this are not currently available in most research stations. Those peer learning groups that have been active have functioned primarily as mechanisms for resource sharing, partnership development and information exchange. These are very positive developments, but additional value will be gained if a stronger learning orientation can be built into their operation so that learning can be consolidated among group members and between groups (Wenger, 2000).

7. Conclusions and way forward

In this paper, we have described how support to capacity strengthening at ARC under the SCARDA project was provided over a three-year period through a package of interventions which were primarily designed to enhance individual competencies of selected staff. We have shown how the training was placed in an organizational change context in which staff identified the capacity needs of ARC, designed activities to address some priority needs, and applied newly acquired skills in their working environment. The capacity strengthening was undertaken within a learning framework, guided by a series of workshops on leadership and management, and complemented by a mentoring process. The hypothesis was that the acquisition of a set of core competencies would lead to a change of mindset among staff which would begin to enhance organizational performance. We now discuss whether, or to what extent, this hypothesis was valid and what needs to be done to build on the gains that have been made.

The implementation of the capacity strengthening activities was constrained by project management issues, beyond the control of ARC, which led to considerable delays with some of the training workshops. Two of the three leadership and management workshops were held within one month of each other at the end of the project period. This meant that early momentum was lost and it also complicated the task of identifying beneficial outcomes that could be attributed to SCARDA activities. It proved difficult to secure the active involvement of all senior managers during the project and this is a challenge facing all capacity strengthening programmes and projects. One activity which helped to partially address this difficulty was the use of a 'gallery walk' at the end of workshops and courses. Senior managers were invited to attend a briefing on the topics covered during the workshop. The briefings allowed the key challenges identified to be shared and suggestions to be discussed on next steps and how managers could facilitate the proposed actions.

A further constraint was that the short courses to upgrade the technical skills of researchers and technicians tended to be organized as stand-alone activities and were not well integrated into the overall change process. In spite of these limitations, however, the staff who participated in the various activities were very positive about the benefits of the training. The information and perspectives shared by ARC staff show that progress was made towards achieving each of the three main desired 'change' outcomes they identified with PICOTEAM in September 2009. Managers and senior researchers introduced new methods, including the use of tools such as feedback, into their working practices and many staff noted that improved communication and team work had resulted. For most of the staff involved, the project was their first opportunity to explore the principles of

research management and to apply them in a learning situation. Staff began to focus more on strategic issues and workshops were held to develop the organization's strategy, outside the formal project activities. New multi-stakeholder partnerships were formed, largely through the peer learning groups that were established with the support of the project. These partnerships had the additional advantage of drawing in new sources of funding at a time when the organization's budget was under severe pressure.

Therefore, there is some evidence of a change of mindset among key staff which has started to translate into improved organizational performance. A critical question, though, is whether the change process has been institutionalized in a way that will ensure that ARC builds on the initial gains that have been made. ARC staff raised concerns about whether mentoring, which they considered to be beneficial to both mentees and mentors, would be established as a mainstream activity within the organization. More generally, as stated by the Director of the Elobeid Research Station (Box 1), it is important that the capacity strengthening approach is extended to a larger number of ARC researchers and stakeholders. Additional external support may be helpful, but sustainable improvements at the organizational level will only occur if ARC management establishes capacity strengthening as a recurrent activity within the organization.

Unfortunately, due to declining government revenues, ARC's budget allocation will be substantially reduced in the next financial year. In order to make best use of limited resources ARC will be prioritizing its research activities and reviewing its current configuration of research stations and centres. The experience of the peer learning groups, which were established on a geographical basis, will help to inform this process. Moreover, as a result of the SCARDA activities, ARC is now in a stronger position to work with other stakeholders to establish their research priorities and develop effective programmes. Although the funding outlook is challenging, this only reinforces the need to finalise an overall strategy for ARC which incorporates a strategy for capacity strengthening. Management and staff have expressed the desire to advance the change management agenda and the priority now is for them to develop concrete plans backed by clear financing arrangements.

ARC will also need to be proactive in identifying non-government sources of funding in order to finance its research agenda. Senior managers have recognized this need and have requested ASARECA to support them to mobilize resources. In this regard, the work of the new planning, monitoring and evaluation unit will be important in generating evidence of the beneficial outcomes of ARC's work. This will require further discussion on how the unit should function and on the funding needed to resource its operations. At present the unit does not have a clear mandate or strategy and it was not possible to obtain any information from the unit on the outcomes or impact of ARC's research.

During discussions with the Director General he stated that he attached considerable importance to the regional dimension of the project. Staff and students had benefitted from the opportunity to interact with researchers and technicians from other organizations and new partnerships and funded projects had resulted from this. The experience of SCARDA at ARC shows that a combination of national and regional level activities can be beneficial. In-country capacity strengthening activities enable more staff to benefit, at lower cost, and make it easier for participants from partner organizations to be involved. Issues that are specific to the organization can be addressed more directly through activities that are geared towards the local context. On the other hand, there are benefits from the

overseas placement of students and the interaction of technicians and researchers in short regional workshops or courses. Regional workshops also play a useful role in the sharing of experiences and consolidation of learning towards the end of a project intervention and this is a function which regional organizations such as ASARECA and RUFORUM are well placed to facilitate.

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Training reports on integrated pest management, laboratory skills for technicians and planning, monitoring and evaluation.

Data from a baseline survey and a mid-term employee survey.

Annex 1

Table 4: SCARDA-sponsored MSc. students from Sudan

Student	Subject area	University	Thesis research title
Lado M. Moga	Plant Breeding	Makerere, Uganda	Inheritance of resistance to rice yellow mottle virus disease in selected rice cultivars in Uganda
Mayada M. Bashir	Plant Breeding	Makerere, Uganda	Introgressing resistance to Turicum leaf blight and mapping of associated quantitative trait loci in sorghum
Luka O. O. Awata	Plant Breeding	Makerere, Uganda	Heterosis and combining abilities for multiple resistance to Turicum leaf blight and maize streak virus
Sufian Mohamed Suilman	Plant Breeding	ARC-Sudan	Genetic diversity among Sudanese Sorghum accessions using molecular markers and phenotypic characterizations
Musa N. S. Abdalla	Agricultural information and communication management	Egerton, Kenya	Challenges facing research institutions in using information and communication technologies to disseminate agricultural information to farmers in Gezira State Sudan
Yazan Elhadi M.	Range Management	Nairobi, Kenya	The link between seasonal climatic variability and poverty: A case study of pastoral and agro-pastoral communities in Baringo District, Kenya
Atif Ahmend Mohamed Musa	Plant Breeding	ARC	Study of combining and heterosis of grain sorghum (<i>Sorghum bicolor</i> L.) using (line x tester) analysis
Mohmed Yousif Balla	Plant Breeding	ARC	Genetic variability of soybean for yield and yield components under irrigation conditions of Gezira, Sudan
Isa Eldin Ahmed Banaga	Soil Science	ARC	Effect of Nitrogen and Phosphorus rates and sources on grain and forage yield of Maize in the River Nile State
Ali Elkhazin Ali Yousif	Soil Science	ARC	Effects of chicken and cattle manure on wheat production and soil properties in the high terrace and Karu soils in River Nile State
Khalid Hamdan Mohamed	Soil Science	ARC	Effect of different types of organic fertilizers on growth, quality and yield of tomatoes in sandy soil

Table 4: SCARDA-sponsored MSc. students from Sudan

Student	Subject area	University	Thesis research title
Amel Osman Ahmed	Soil and Water Management	ARC	Phosphorus Sorption , Desorption and Buffering Capacity as a guide for Phosphorus availability of Some Selected soil Series
Amel Ahmed Ali Sidahmed	Soil and Water Management	ARC	The effects of water stress on yield and productivity of two newly released wheat varieties
Mariam Abdalla Mohamed	Horticulture	ARC	Evaluation of micro and macro propagation techniques of Gerbera (Gerbera Jamesonii) under different conditions
Ahmed Babiker Ahmed Khalifa	Horticulture	ARC	Effect of drip irrigation system and fertigation on growth, yield and quality of banana cv. Grand Nain (Musa AAA)

Annex 2

Table 5: Timeline of the main SCARDA activities in Sudan

Date	Activity	Organizations	Results and assessment ¹
2007			
May	Regional Stakeholder workshop in Entebbe (4 days) 1 participant from ARC	Representatives of ASARECA countries, ASARECA, RUFORUM, NRI	Main elements of the project defined
August	Scoping study (1 month)	ARC consultants	Key capacity issues highlighted
2008			
July	Agreement on the priority needs and capacity strengthening interventions (4 days)	ARC, University of Kordofan, ASARECA, RUFORUM, Natural Resources Institute (NRI)	“Not all of the original proposals were taken up; for example, there was a suggestion that ARC would act as a regional Centre for training in integrated pest management.”
August	MSc students nominated	ARC, RUFORUM, ASARECA	Students identified for the priority research areas and matched with appropriate universities. “The MSc studentships are in areas which are important for ARC and in line with its priorities.”
December	Meetings to discuss IPM training needs (2 days)	ARC, RUFORUM, NRI	Training to focus on sustainable strategies for managing pests in intensive, high value production systems.
2009			
January	Regional planning, monitoring and evaluation workshop (4 days) 5 participants (all men) from ARC	ARC, ISABU, ISAR, NRI, ASARECA, RUFORUM	Wide variation of relevant expertise in the group. Useful initial orientation, but no follow-up provided.
April	Scientific writing course (5 days)	ARC MSc students and research assistants	“The scientific writing course was excellent. We need another course to allow more researchers to benefit.”
September	Design of learning workshops	PICOTEAM, ARC	Programme design finalised

Table 5: Cont.

Date	Activity	Organizations	Results and assessment ¹
November	1 st technician training in Uganda (2 weeks) 2 women, 6 men from ARC	NACCRI, ARC, ISABU, ISAR	“Technician training improved skills and knowledge, but the course was too short.”
2010			
January	IPM training workshop at ARC (5 days) 17 women, 10 men from ARC and partner organisations	NRI, ARC, RUFORUM	“IPM course useful but more time needed to cover all the topics. Strengthen the ARC training Centre.”
February	1 st Learning Workshop Research Management, Leadership and Mentoring (5 days) 45 participants (40 men, 5 women)	PICOTEAM, ARC, ASARECA, RUFORUM	Initial plans developed for 9 peer learning groups. “Research management workshop addressed relevant topics and the facilitation was good.”
March	Mentoring workshop 23 participants (18 men, 5 women)	PICOTEAM, ARC, ASARECA, RUFORUM	Mentees matched with mentors.
March	Employee mid-term survey 16 ARC staff (7 men, 7 women, 2 did not indicate gender on form)	ARC, NRI	Data on project progress collected. Testimonies on selected activities conducted to March 2010.
May	2 nd technician training in Uganda (2 weeks). 8 participants from ARC. No data on gender.	NACCRI, ARC, ISABU, ISAR	Second cohort of technicians trained. New central facility for technicians established at ARC.

¹ Quotations in italics are testimonies from 16 participants in a workshop held at ARC. The testimonies represent a ‘consensus view’ among the participants.