SARD-SC
Support to Agricultural Research for Development of Strategic Crops in Africa

Annual Report 2013

CGIAR
Support to Agricultural Research for Development of Strategic Crops in Africa

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Science for Better Livelihoods in Dry Areas

IITA
Research to Nurture Africa

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From the SARD-SC Project Coordinator
Dr Chrys Akem

It is my pleasure to present to you the second Corporate Annual Report of the Multi-national CGIAR project "Support to Agricultural Research for Development of Strategic Crops in Africa" (SARD-SC). This project is funded by the African Development Bank (AfDB) and implementation is led by the International Institute of Tropical Agriculture (IITA). In this Report we focus on a few of the project achievements from the past one year that the project has been in effective implementation across the four commodity value chains.

Even in the midst of the many challenges in implementing a complex project that involves four commodities (cassava, maize, rice, and wheat), four CGIAR institutions (IITA, ICARDA, AfricaRice, and IFPRI), and 20 Regional Membership Countries (RMCs) -Benin, Côte d’Ivoire, DR Congo, Eritrea, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Tanzania, Uganda, Zambia, and Zimbabwe, some achievements and impacts from the project are already clearly visible in some of the focused RMCs.

The Cassava value chain has made giant strides in establishing needed infrastructures for cassava processing and equipment fabrication across different hub countries in which the cassava project activities are focused. Already completed and now fully functional and serving the regional hub of Central Africa is the cassava factory established at the IITA research station in Bukavu, DR Congo. In this report we give some highlights of this establishment and the role it is expected to play in diversifying the uses of cassava in the Central African region.

Within the Maize value chain of the project, we go into the analysis of the different Innovative Platform approaches that have been adopted for use in implementing many of the activities of the different commodity value chains. We visit operations in Ghana and Nigeria and follow through on the establishment and operations of these IPs, just as examples of how this can be and are used to link various stakeholders for effective dissemination and use of project technologies.

The focus on the Rice value chain is on the introduction and manufacture of farm machinery prototypes to ease labor in farm and postharvest operations and at the same time improve the quality of the products. Capacity building activities which are also an integral part of this project implementation are highlighted in this value chain.

With the Wheat commodity value chain, we share the success story of wheat making it unto the Nigerian agricultural transformation commodity list because of demonstrated high yields of adapted wheat varieties evaluated and selected across locations through the project. This is a good example of how the project can impact directly on policy decisions within a country in terms of achieving food security and also making decisions on trade issues.

It has been a very busy and effective first year of the project full implementation with participation of the project teams in various field events and visits to project sites to access project operations and plan with national partners for continuous effective implementation. The various commodity value chains have also linked up with young agripreneurs across various hubs to assist with the dissemination of project outputs and demonstrate that youth employment opportunities do exist in agriculture when it is taken up as a business. Activities have included the production and distribution of various planting materials and the promotion of diverse crop uses to different stakeholders across the operational regions.

We are already at midway of the project implementation, even though we have just been in effective operations for about one and a half years. We have plenty to demonstrate by way of achievements and shall be taking stock through an upcoming mid-term project review on what needs to be adjusted for continuous effective implementation of the project. We look forward to the outcomes of this project in the years ahead and shall continue to update and highlight achievements in future annual editions of this Report. The project shall also continue to build on the successes and achievements of each year as it strengthens partnerships with the RMCs, welcome new partners wanting to participate in the public goods from the project, while intensifying efforts to improve the livelihoods of all our stakeholders, especially the youths and smallholder farmers of Africa.

We will continue to be guided in these efforts by our strategy and commitment to sustainably improve food and nutritional security on our target crops while ensuring that poverty is reduced among the target stakeholders. We will also ensure that the outcomes of our efforts are freely available to all as Regional Public Goods so that no one is left out in benefiting from the project outputs.

I wish you all an enjoyable reading.
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The SARD-SC project with funding from the African Development Bank (AfDB), has constructed and established a multi-purpose cassava processing factory at the IITA Kalambo station in DR. Congo. The factory, which has four units, will be used for cassava processing, fabrication of equipment, soybean processing and exhibition of various processed products.

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The first of its kind in the South –Kivu area of DRC, the factory, will among other things, promote food security through conservation and transformation of agricultural produce into marketable processed products. The cassava processing unit will be used for processing cassava into garri and high quality starch as well as some other 20 by - products for household consumption and income generation for the farmers and other stakeholders in the region. The fabrication of processing equipment such as graters, sieves, miller, press, chippers and drying tables will be undertaken in the second unit of the facility.

In addition to its statutory functions and purpose, the construction of this factory is significant to the development of DRC’s economy because of the expected extra income the processed products will generate to the farmers. One of the other expected benefits of the factory is the development of the capacity of the local artisans through the acquisition and introduction of new technologies. It will also offer huge employment opportunities for the teeming unemployed young men and women, who will now play major roles in the agricultural processes Scientists and Researchers working with the SARD-SC cassava value chain team in the country will also gain knowledge in processing cassava into many different products.

While the factory was under construction, the Bukavu city was palpable with excitement, as the people looked forward to seeing the factory completed and operational. It was eventually completed on schedule and launched on the 5th of June, 2014, in Kalambo, DRC, with several important personalities from different regions and countries in attendance.

The cassava processing unit will be used for processing cassava into garri and high quality starch as well as some other 20 by - products for household consumption and income generation for the farmers and other stakeholders in the region.
The beauty and the importance of the factory attracted the attention of visitors as well as donors represented by the top echelons of donor groups to the launching. The Honorable Ministers of Agriculture from DRC and Burundi, and the South-Kivu Governor as well as the Catholic Arch Bishop of the Diocese of Bukavu, attended the launching and commended IITA for the building and the innovation of processing cassava into various products. Impressed by the significance of the new factory and its benefits on promoting food security and increasing average expected income of farmers in the country, the visitors pledged to support and collaborate with the SARD-SC team and IITA to promote the growth of cassava roots in the country so that constant raw material will be available for the unit.

In his remarks at the launch, the South-Kivu Governor, Mr. Marcellin Chisambo, commended IITA and the SARD-SC project for its contribution to enhancing the status of the cassava crop through value addition and establishing a factory to process the crop into various different products. He noted the cassava processing factory would bring about multi faceted advantages to the vicinity by providing job opportunities, developing capacity of the local people and enhancing the income generation of households. Mr. Chisambo pledged his continuous support to IITA and the project for the important agricultural development they have brought to his province.

Preceeding DG Sanginga's remarks at the product demonstration unit of the factory was Dr. Bernard Vanlauwe, IITA Central Africa, Director and SARD-SC cassava commodity specialist, Dr. Marie Yomeni, who took some of the visitors, among who were the Rwandan and Burundian Ministers of Agriculture, the Nigerian Ambassador to DRC and the North Kivu Governor to the Cassava exhibition center where they admired and tasted more than 40 baked products from cassava and Soybean flour. Perhaps, for the first time in their lives, the guests tasted various cassava cookies to their delightful surprise. After tasting some of the products, Mr. Chisambo could not help quipping that, “I did not know cassava could produce very tasteful recipes, I thought I could not swallow a product made from cassava itself but now, I am surprised with this new innovation. I have all the interest to support and promote Cassava in this province.”

On display during the launching were the products made from cassava such as Cassava bread with 40...
and 20% flour, cassava Cake, Cassava Doughnuts, Cassava Queen Cakes, Cassava chin-chin, Cassava root fritters, Cassava coconuts Cookies, Cassava Egg Rolls, Cassava Root Croquettes.

The IITA women group from Ibadan headquarters, led by Mrs. Charlotte Sanginga and a few representative colleagues, visited the processing center a day before the Kalambo launching event. They had the opportunity to see the women processors from different territories of South-Kivu, accompanied by men who have shown capacity and commitment to work and promote the cassava new products in their households.

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One of the units of the factory is for the fabrication of assorted cassava processing machines, within affordable costs since they are made with locally sourced materials and using local artisans. Some of the benefits of this unit include the processing of various agricultural produce, and reducing importation of raw agricultural materials. These units are a new source of agricultural promotion in South-Kivu in particular and DRC in general.

The processing machines fabricated in the center will serve as prototypes not only for national artisans but also for regional ones from Rwanda and Burundi. The availability of these machines would be extended and promoted to other SARD-SC project regional partners as well as non project partners as regional public goods to enhance their processing of agricultural produce.

The launch was followed by a visit to the cassava processing factory from DR. Congo’s first lady, Madame Olive Lembe Kabila. She witnessed firsthand IITA’s post harvest innovations and cassava and soybean value chain product development IITA is pioneering in the country. She was highly impressed by the use of cassava and soybean flour for baking such as cakes, bread, doughnuts and other culinary delights.
Experts develop capacity of project partners on processing cassava and soybean flour for value addition

In order to develop the capacity of the people on the many ways cassava can be utilized, the SARD-SC project team in DR. Congo organized a Training of Trainers workshop on the techniques of processing cassava and soybean into high quality flour and more than 20 by-products. Participants at the workshop were project’s partners who included actors in the cassava value chain- producers, processors and sellers- from different territories, the provincial ministry of Agriculture, private sectors and local organizations.

In tandem with the project’s component focus on agricultural technologies and innovation dissemination, the purpose of the training was to build the capacity of the people to make edible products from cassava and soybean flour such as cakes, bread, doughnuts and the likes.

The facilitators, Mr. Gregory and Mrs. Ronke Popoola, staff of the Hotel and Catering Services of the IITA, Ibadan Headquarters, introduced and taught the participants the versatility of cassava and soybean flour. Some of the areas of training were: How are to make cassava and soy flour from freshly harvested crops from the farm; How to dry the flour, the percentage of flour to add in recipes, the basic equipment and ingredients to use and processing steps among others.

The 9 day training took place at the IITA Kalambo station, South Kivu, from 22nd to 30th April 2014. Mrs. Adolphine Mulley, of the Provincial Ministry of Agriculture, who represented the DR. Congo government, declared the training open and delivered a speech on behalf of the government. She said: “Agriculture is one of the priorities of the government, this is the reason why the government continues to support IITA activities and training of our people in particular. I want to implore you, the participants, to pay attention to what you are being taught because you are the representatives of the people from all the territories. So, it is from you others will learn.”

She also encouraged the participants to seize the opportunities of the training to be able to make impact from these innovations in the Province. She also encouraged and commended SARD-SC project Commodity Specialist, Dr. Marie Yomeni, for her initiatives and support for the local population.

The number of participants at the training was 65, comprising both men and women. The benefits of the training programme and innovation dissemination would enhance development of small scale businesses, provide employment opportunities and food security.
in the households. With increased use of cassava and soybean flour for consumption and industrial uses, more farmers would likely embrace planting of the crops. As a result, it would engender increased production of the crops thereby raising the average annual household cash incomes of farmers, while providing a steady source of raw materials for the newly established SARD-SC project cassava processing factory, in Kalambo, for industry and export to other countries.

Besides enhancing food security, participants said the training afforded them the opportunity to learn the many uses of cassava and soybean, and other people’s culinary culture through the introduction of garri and fufu, made from cassava into DR. Congo. Each of the trainees pledged to train about 50 persons in their territories and organizations.

Since the training was done in groups, one group learned about Soybean processing while the other one learned Cassava processing. The processing and value addition skills they learnt would build their capacity to use the processing unit installed at the Kalambo station while the exhibition center would be used to display and market their products.

**Context of training and its Impact on the DR Congo food security**

The Democratic Republic of Congo is among the largest producers of cassava in Africa. Unfortunately, apart from the products commonly known as “Ugali” and “Chikwange,” flour and milk, no other products made from Cassava and Soybean were known by the local population. The use of cassava flour and soy in bakery products and other food products is relatively new though insignificant compared to the enormous potential and opportunities available in the area. Cassava flour and soy are partial replacement of wheat flour in the production of bread, biscuits, pastries and snack crusts. En bref cette formation a pour objectif:

Thus, this training was aimed at disseminating the new technology and innovations to the farmers and SARD-SC project partners to enlighten them about the many uses of cassava and soybean crops and flour. The products made from these two crops were very acceptable to the participants, the ordinary people as well as the guests at the launching of the cassava processing factory.

At the end of the training, Dr. Marie Yomeni and Dr. Paul Dutsop, acting Head of IITA, Kalambo office, presented certificates of attendance to the participants. Some of the products made from Cassava are: Cassava Bread, Cassava Cake, Cassava Doughnuts, Cassava Queen Cakes, Cassava Chin-Chin, Cassava Root Fritters, Cassava Coconuts Cookies, Cassava Egg Rolls, Cassava Root Croquettes, Cassava Strips, Cassava Sausage Rolls, Cassava Meat pie.

Products made from soybean flour were: Soy Sausage Rolls, Soy Muffins, Soy Cheese, Soy Milk, Soy Pastry Pie, Soy Biscuits, Soy Peanut Butter Cookies, Soy queen cakes, Soy oatmeal cookies, and Soy cakes.

However, few weeks after this training, 10 participants through their organizations: ACOSYF, ISANDA, FONIMIS, IPLCL, AGIR, GRADEM, PAMED, COOPTRAFF, etc., including the agro processors’ network, held a similar training on the use of cassava and soybean flour for baking for more than 700 people in their respective territories; Mwenga, Bunyakiri, Uvira, Walungu, Kabare, etc.
As part of the dissemination and adoption of sustainable agricultural technologies and innovations across the value chain, the SARD-SC project organized a 3-day workshop for training its partners in the development of functional and sustainable Innovation Platforms (IPs). The training started from 15th to 17th April 2014 at the Carista Guest House in Kinshasa DR Congo.

The purpose of the workshop was to train actors on the Cassava value chain on the implementation of functional and sustainable Innovation Platforms in order to have visible and applicable results in the cassava sector and other operational areas of the project.

Participants at the training were from the three SARD-SC implementing provinces of the DR Congo: Bas-Congo; Kisangani and South Kivu. The SARD-SC Commodity Specialist, Dr. Marie Yomeni, the IITA Country Representative and SARD-SC National Coordinator Dr. Mahungu Nzola, in DR. Congo and SARD-SC researchers and administrators were in attendance. Trainers were Dr. Ousmane Coulibaly with his team.

While declaring the workshop open, Dr. Nzola said the workshop was purely a technical one which aimed at establishing a new and improved agricultural system in the DRC through the innovation platforms. “We want to have functional and sustainable platforms in all the zones of project and I expect participants to acquire requisite knowledge and understanding of what each of you have to do in the innovation platforms because we must capitalize on this opportunity and organize ourselves for the future as the future belongs to those who are organized,” he told the participants.

He gave an example of a functional Innovation Platform, Association of Producers and Processors of Cassava (APTM) in Kinshasha, which was consolidated by his efforts and has been in existence since 2007. The IP, he said, is now very formidable and receives funds from other organizations.

Dr. Marie Yomeni, SARD-SC project, Commodity Specialist, said she expected participants to be...
able to apply what they have learnt to establish strong Innovation Platforms at the end of the training. Different presentations were made by researchers and the group of trainers:

Dr. Kokou Kincthe, SARD-SC Researcher presented the program and the objectives of the training. He emphasized that the training was aimed at training actors to have visible and applicable results in all the areas the IPs were to be implemented;

Mr. Coulibaly Ousmane presented the concept and principles of an innovation platform through the value chains and good governance of the IPs. Mr. Gbaguid Brice made presentations on IPs facilitation techniques, coaching and monitoring in the IPs and the mapping of IPs through the groups.

The second day of the training was scheduled for field visit. All the participants visited the Association of Producers and Processors of Cassava (APTM). This visit gave them opportunity to understand how APTM operates and its source of funding.

Currently, it is funded by national, international and state Organizations such as the Agricultural Ministry (MINAGRI), USAID, IITA, FPI, FAO, SNV/Netherlands, with contributions from members through membership fees and grants. The IP has 20 members, with 60% women and 40% men, who work together for the success of its objectives.

On the last day, participants discussed their views and experiences on the field visit and synergized for the development of the Innovation Platform.

The workshop ended successfully with the participants committed to achieve the following:

• Establish as soon as possible all the necessary mechanisms to influence and mentor local farmers working in the Cassava sector to form a platform for innovation value chains;

• Mobilize resources, make contribution, employ labors, have land grant and access to equipment and agricultural machines to maximize the production of Cassava to meet the expectation of SARD-SC project and supply a local transformation unit.
Attaining the specific objective of boosting maize yield from 2.0 to 2.5 t/ha in target regions of four (Ghana, Mali, Nigeria, and Zambia) countries and reaching a minimum of 1.5 million smallholder farm families within the shortest possible time means a departure from the norm. Consequently, the traditional researcher-extension-farmer approach to technology dissemination, though very quite successful, has not been able to enhance levels of competitiveness of the maize crop.
Therefore, the project built its extension on innovation platforms (IPs) for fostering interaction among stakeholders and thus accelerating adoption of technologies.

The Innovation Platform (IP) is an informal partnership of public and private scientists, extension workers, representatives of farmers, farmers’ associations, private entities, nongovernmental organizations, and government policy makers that communicate, cooperate, and interact based on a common belief that increasing agricultural productivity can assist in improving the welfare of all members of society. An IP operation is based on four pillars starting with the setting-up of the IP to serve as the platform for diagnosing problems and exploring opportunities as well as investigating solutions.

The second pillar is ensuring a non-linear, collective, and collaborative interaction among the IP actors as opposed to the traditional linear researcher-extension-farmers transfer of technology while the third pillar is the conduct of multidisciplinary and participatory research that addresses issues identified and agreed upon by the IP actors. The fourth pillar is the cross-cutting issue of capacity building of the IP institutions and members to effectively participate.

Three IPs have been established in each of the four countries and baseline surveys conducted. Positive effects of using the IP approach are already being manifested. In this report, we provide details of a well-functioning IP using examples from Nigeria.

**Oyo axis of the Oyo-Kwara IP in Nigeria**

The Oyo-Kwara IP involves two autonomous states and two Local Government Areas (LGAs) from each state made up the IP. The LGAs were Saki East and Saki West from Oyo State and are Asa and Moro from Kwara State. These four LGAs are undoubtedly, important agrarian areas extending from Saki West in the humid forest of the western region to Moro in the southern Guinea savanna of the central region of Nigeria. Both states have unique endowments and opportunities shaped by their development histories and the resilience of settled ethnic groups.

Ibadan, the capital of Oyo State, boasts of having the first university in Nigeria, the University of Ibadan, established in 1948 and the first television station in Africa, established in 1958. Agriculture is the primary source of employment in the State which reflects in the economy, culture, and lifestyle of the people.

On the other hand, Ilorin, the capital of Kwara State has a checkered history almost similar to Ibadan. Indeed, the four LGAs have similar vegetation and grow similar annual crops including maize. In order to ensure proper targeting of issues at IP level,
capacity building workshops were held across all IPs to enable partners to gain the skills for the conduct of community analysis and to develop IP-specific operational business plans. The activity stimulated an early buying-in and mobilization at IP level. This has led to improved understanding of the diversities in resource endowments and livelihood challenges and opportunities in each of the target communities within the IP. Similarly, participating communities under the project are gaining the confidence they need to interact with various stakeholders to negotiate and to improve their resource-use capabilities and decisions. An example of community analysis in Agbonle located within Saki East LGA is provided below.

Community analyses of Agbonle in Saki East LGA

Agbonle community has a population of about 7300 people of which 3300 are male and 4000 female; the youth make up thirty percent of the population. The community is laid out in the derived savanna ecology with patches of forest. Most of the men in the community are farmers of a highly diversified range of crops. While about 60% of the women grow soybean, egusi melon, maize, and vegetables, the youth produce mainly maize, soybean, and groundnut. They also engage in using motorbikes for passenger transport business.

The settlement pattern is linear and ethnic composition includes Yourba, Hausa, Ibo, Togolese, Tangita from Benin Republic, and Egede from Benue State of Nigeria. Others, though minor, include Tivs, Jukun, Fulanis, Bororo, Zumba, Bariba, Tokosi, and Ojoja, all from Nigeria.

The soil of Agbonle is about 70% sandy loam and 30% clay loam with declining soil fertility. Farmers always rely on fertilizers to produce a good crop. The crops grown in order of preference are: maize, soybean, sorghum, yam, cassava, melon, groundnut, cowpea, and cashew. The stem borer is a problem especially for the second season crop.

Mixed cropping predominates in the cropping system mainly as a food security strategy. In recent times, dry spells have occurred annually varying in severity and duration and inflicting damage on crops. Livestock and crop farmers frequently clash, sometimes resulting in fatalities. Migrant herdsmen are primarily responsible for the clashes and not the resident Fulani herdsmen. Efforts to establish dialogue has partially been helpful.

The community has a king called the IBA of AGBONLE and he has seventeen chiefs. It is about 35 km from the LGA headquarters and neighbors include Ilesha Ibariba (N), Bode (E), Saki (W) and Igboho and Ogboroo (S). There is a market within the community that is held every 5 days and is patronized by several cities including Lagos. Agro-dealers regularly come to the market though there are no facilities—no bank, bad roads.

The community has a seasonal river at the fringes of the community which is not used for irrigation but occasionally used for domestic water supply.
Local varieties of maize are commonly planted owing to lack of better alternatives. The Government Growth Enhancement Scheme initiated in 2012 enabled many farmers to access seeds of one improved maize variety called Suwan yellow.

Farmers in the community are growing a local maize variety called Pambo which is tall and matures in about 130 days. The community prefers big-seeded maize grains. Maize yields are low and rarely above 1.5–1.8 hectare/ha when fertilizers are used and much lower without fertilizers. Use of organic fertilizers is uncommon.

The community has primary and secondary schools, one health center, one private hospital, churches and mosques, three grinding mills, and no industrial processor. It also has:

- A cooperative group called Agbelere Farmers’ Cooperative Society formed in 1986 that meets monthly to consider loans to members or on how to conduct produce marketing such as maize, soybean, yam chips, and locust bean. They also buy, store, and sell in these commodities in the same market.
- Produce Marketer Association maize, soybean (middlemen) union.

Constraints listed by stakeholders in the community include:

- Lack of access to credit and tractor services
- Scarcity of labor (rely on migrant labor)
- Conflicts with herdsmen
- Decreasing yields/declining soil fertility/High input cost, e.g., fertilizer
- Unstable price of maize grains, lack of improved seeds,
- High incidence of pesticide injuries due to poor handling, lack of skill to practice irrigation agriculture
- Pest attacks Stem borer/streak, attacks by monkeys and bush fowl termites, rodents. Drought, Dry spell
- Bush burning and armed robbery

Action points generated from community analyses of Agbonle

Information and data generated from the community analyses involving research—extension—farmers*other stakeholders enabled the compilation of action points to be executed by all stakeholders (See table on page 12).

Enhancing IP operations through policy dialog

Pursuing the listed action points is already yielding results in Saki East and Saki West LGAs where strong support from government policy makers was displayed in the provision of motorcycles to Extension Agents (EAs) to effectively monitor IP activities.

The project is thus committed to building linkages that ensure that technologies generated are relevant in addressing the development challenges. These include increasing the productivity of maize enterprises under a severely deteriorating natural resource base, weak input and output market connections, overcoming the scourge of Striga and stem borers, the high cost of inputs such as fertilizers.

This enables the business of farming by improving access to quality seeds of high yielding varieties, labor saving devices, and modern production techniques/tools that are attractive to the youth. Key partners with long-term experience and interests in these issues such as maize commodity associations and feed mills are being co-opted to broaden the engagements and enhance opportunities for participants on each of the IPs.

The Zonal Manager of OYESADEP displays 8 motorbikes made available to EAs in support of SARD-SC field operations in Oyo State, Nigeria.
<table>
<thead>
<tr>
<th>Target</th>
<th>Constraints</th>
<th>Mitigation options/entry points</th>
<th>How to mitigate and by Who/When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Improper use of fertilizers</td>
<td>• Training/demonstration of fertilizer use</td>
<td>• Two demonstrations on fertilizer use, application methods in 2014 and 2015</td>
</tr>
<tr>
<td>Poor/irregular rainfall / drought/dry spells</td>
<td>• Introduce DT varieties</td>
<td>• At least 2 DT maize with farmers preferred traits introduced in 2014 and promoted in 2015</td>
<td></td>
</tr>
<tr>
<td>Stem borers</td>
<td>• Introduce borer resistant varieties</td>
<td>• Conduct training on control of stem borers in 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Evaluate IK for Stem borer control for dissemination</td>
<td>• Collate information of IK for stem borer control in 2014 and evaluate at least one in 2015</td>
<td></td>
</tr>
<tr>
<td>Conflict with cattle rearers</td>
<td>• Community dialog team</td>
<td>• Set up one dialog team by consultation with stakeholders to deal with the conflicts and facilitate their meetings in 2014 for relevant communities</td>
<td></td>
</tr>
<tr>
<td>Low financial resources</td>
<td>• Links to credit institutions</td>
<td>• Facilitate linkage with at least one credit provider in 2014 and 2015</td>
<td></td>
</tr>
<tr>
<td>Traditional cultural method farming leading to low productivity - wide spacing</td>
<td>• Training and demonstration on benefit of proper spacing</td>
<td>• Two demonstrations on proper pesticide use and handling</td>
<td></td>
</tr>
<tr>
<td>Improper use of pesticides</td>
<td>• Introduce /demonstrate LSDs</td>
<td>• Establish at least 1 link with tractor repair center and 3 service providers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Facilitate acquisition of appropriate LSDs where possible</td>
<td>• Introduce/demonstrate 1 power tiller</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strengthen linkage with tractor hiring services providers and repairers</td>
<td>• Facilitate access (in 2015) to 20 pesticide sprayers and 2 mobile threshing machines</td>
<td></td>
</tr>
<tr>
<td>Poor linkage with input manufacturers/dealers</td>
<td>• Facilitate access to input dealers</td>
<td>• Facilitate linkage with at least 1 seed company and 1 Agrochemical/fertilizer dealer in 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strengthen local input dealers</td>
<td>• Train input dealers to render product advisory support services on their products in 2015</td>
<td></td>
</tr>
<tr>
<td>Unemployed youth</td>
<td>• Strengthen youth groups to engage in service provision- (Farm operations such as tilling, weed control, threshing/processing, warehousing)</td>
<td>• Mobilize and train at least 1 youth group (in 2014) to – Produce seeds linked to seed companies – Render postharvest processing operations such as threshing</td>
<td></td>
</tr>
<tr>
<td>Tedious manual processing</td>
<td>• Facilitate access to processing facilities for groups</td>
<td>• Facilitate youth groups to render such services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Training</td>
<td>-do-</td>
<td></td>
</tr>
<tr>
<td>No threshing machines</td>
<td>• Empower youth groups to render such services</td>
<td>-do-</td>
<td></td>
</tr>
<tr>
<td>Marketing</td>
<td>Few buyers come to local market owing to bad road</td>
<td>• Facilitate access to bulk users</td>
<td>• Facilitate cooperative marketing from 2014</td>
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<td></td>
<td>• Facilitate linkage to bulk users</td>
<td>• Facilitate linkage with bulk users/marketers from 2014</td>
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<tr>
<td>No storage facilities (warehouse)</td>
<td>• Empower youths to render such service</td>
<td>• Facilitate access to credits for warehousing receipts from 2014</td>
<td></td>
</tr>
<tr>
<td>Not linked to bulk off takers e.g., feed mills, breweries, food industries</td>
<td>• Facilitate linkage to bulk users</td>
<td>• Facilitate cooperative marketing from 2014</td>
<td></td>
</tr>
<tr>
<td>Price disputes/ improper pricing</td>
<td>• Facilitate negotiations and contracts</td>
<td>-do-</td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td>No dialog with policy makers</td>
<td>Link community to local government</td>
<td>Facilitate linkage to policy makers</td>
</tr>
</tbody>
</table>
Coordination and backstopping

A fairly uniform coordination mechanical system has been institutionalized in each country and at every IP level with inbuilt flexibility to enhance communication, visibility of responsibility, attribution, traceability of activities, and reporting. Each IP has linkages with the Country Coordinator of the Project, the state/regional Task Officer usually within each of the host states/districts, and the nearest research institution to ensure mentoring and technical backstopping to compliment IITA oversight.

Another backstopping effort is the provision of bulk seeds, breeder and foundation, to seed-producing entities thus ensuring that quality seeds are disseminated and used within the IPs. To this end, an air-conditioned seed warehouse with a capacity to hold more than 200 tons of breeder and foundation seeds has been built at IITA headquarters in Ibadan to fully backstop seed production and use for the IPs.

The facility currently holds more than 60 tons of breeder or foundation seeds for further multiplication as required by the end-users.

Regular multiplication of breeder or foundation seed is also carried out all year round under both normal and irrigation seasons to ensure that viable seeds are made available on request.

A major challenge to the use of IPs for technology dissemination is that of slow understanding of procedure and protocols among stakeholders, a situation that the community analyses adequately addressed. Thus, the project is now poised to deliver on its outputs and straighten farmers' ability to sustainably help themselves.
One of the major activities of the SARD-SC project is the generation of agricultural technologies and knowledge for dissemination to end-users in order to improve local rice productivity, production, and quality. Before generating agricultural technologies for dissemination to actors along the rice value chains in the SARD-SC target countries, it was necessary to first identify the constraints faced by these actors. Consequently, diagnostic surveys were conducted in 10 project countries. Data transcription and cleaning has been completed in six countries (Benin, Côte d’Ivoire, Ethiopia, Niger, Senegal, and Tanzania) and is ongoing in four countries (Ghana, Madagascar, Nigeria, and Uganda).

To equip the NARS focal persons in charge of the diagnostic survey with the necessary qualitative data analysis skills, NARS scientists from 14 countries, including 10 from nine SARD-SC project countries, were trained at AfricaRice on diagnostic data analysis.

The training course on Advanced Qualitative Data Analysis using NVivo 10 for the diagnostic survey research was a follow up to the training workshop held in February 2012 on the diagnostic survey research methodology. The diagnostic survey is being conducted within the framework of the Agronomy Task Force research activities. Research is coordinated by NARS focal persons/scientists in 15 countries with technical backstopping from AfricaRice. This training course especially targeted these focal persons/researchers and their needs to complete the data analysis and reporting phases of the scope of work.

The main objective was to equip the diagnostic survey focal persons/researchers with the necessary qualitative data analysis skills using the NVivo 10 software to analyze diagnostic survey data. Specific objectives were to:

- Review progress of the diagnostic survey research activities per country.
- Present and discuss the preliminary results.
- Share challenges and lessons learnt during data collection, transcription, etc.
- Actively participate in NVivo training modules and related exercises.
- Actively participate in the working groups on case study analyses.
- Revise the work plan for the completion of data collection, analysis, and reporting.

The key highlights from the NVivo training course, the progress of the diagnostic survey in the 15 countries and way forward for data analysis and technical report drafting are as follows:
The trainer

The training course was provided by Dr Silvana di Gregorio Gardiner, QSR International Training and Consultancy Manager in the United Kingdom; QSR is the company that produces the NVivo qualitative analysis software program. This training course was customized to the diagnostic survey research and comprised four days in total: one day focusing on updates on the current diagnostic survey research in-country and three days focusing on training modules on how to use NVivo, facilitated by Dr di Gregorio. The customized training program allowed participants to successfully learn and apply the software through hands-on exercises using their own data. It is worth noting that though the trainer was paid for three days, she accepted to freely add one more day to help participants learn how to run further queries and analyses using NVivo 10.

Attendance, certificate, and NVivo License

The training was attended by 15 diagnostic survey focal persons from 14 countries: Benin, Cameroon, Côte d’Ivoire, Ethiopia, Gambia, Ghana, Ghana, Mali, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, Togo, Uganda (Figs. 1 and 2). Only the focal person from Madagascar was unable to attend. However, a three-day training session was conducted for him in May 2013 in Cotonou, Benin. All participants received a training certificate from QSR International. AfricaRice provided each country with one NVivo 10 Software license that can be used on two different computers.

At the end of the training, each participant received a USB key of all training proceedings (country presentations, NVivo training course presentations, and diagnostic survey research supporting documents including methodology, “next steps” to support analysis and reporting). This USB key can be obtained from the diagnostic survey coordinator, Dr Cara Raboanarielina (c.raboanarielina@cgiar.org).

Participant Feedback

Participants stated that they were very satisfied with the NVivo training course. They all found that the NVivo software is a new tool that will help them conduct qualitative data analysis and carry out their job more effectively. They found the duration of the training too short and recognized that they need further exercises to be more familiar with the NVivo 10 software.

Way forward for data analysis and technical reports drafting

The following recommendations were given by Dr Raboanarielina to the diagnostic survey focal persons during the plenary session of the training workshop:

1. Focal persons were urged to train other scientists in order to share the knowledge acquired (i.e., qualitative data analysis using the NVivo 10 software) with their colleagues.

2. Finalize data transcription immediately and proceed quickly to data analysis and country technical report writing.

3. As NVivo offers opportunities to use various types of data, participants were encouraged to try as much as possible to use diverse types of data/information (pictures/video on relevant topics related to the issues raised by farmers/key informants, hubs/sites maps, journal articles, NRDS country reports).

4. AfricaRice will explore how to provide additional technical backstopping to selected focal points to complete data analysis and technical reporting by the due date of October. However, an extensive stay to complete the analysis and reporting in Cotonou will be explored and discussed case-by-case depending on the progress of the research in each country and individual researchers’ needs.
It is a known fact that farmers' yields fall short of the potential of the improved varieties made available to them. However, the yield gaps in the various countries have not been well documented. In order to determine these yield gaps and what is responsible for them, yield gap surveys were completed in all the 11 project countries (Benin, Côte d’Ivoire, Ghana, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, Ethiopia, Madagascar, and Uganda). Soil, straw, and rice grain samples (7−100 farmers per hub, 1−3 hubs per country) were collected by the NARS in the project countries. Thus far, 11,676 soil, straw, and rice samples have been collected. These samples are being analyzed at AfricaRice, Benin for N, P, K content (all samples) and for C content, texture, and pH (soil samples only).

Based on preliminary results from the diagnostic survey, yield gap survey, and monitoring tour, together with local experts' knowledge, several constraints were identified (Fig. 3) and the first version of the Hub Facts Sheet was developed to assess rice farming systems in different countries (HubFactSheet: http://www.ricehub.org/).

The output of the yield gap survey is summarized in Figure 5 and clearly shows the yield gap in 27 African countries, including the 11 SARD-SC target countries.
To resolve the constraints identified in the diagnostic and yield gap surveys, the following 15 prototype agricultural innovations have been identified and are being tested at AfricaRice and with NARS partners:

- Validation of Nutrient Manager (a decision support tool to identify pre-season fertilizer requirements) (Benin, Nigeria, and Senegal). Nutrient Manager is being developed in all project countries. In Benin, Côte d’Ivoire, and Madagascar, nutrient omission trials have been conducted. In Nigeria (Kano Hub), in-depth validation of the tool was conducted by the Catholic Relief Services (CRS).

- Development of blueprints for weeder fabrication and testing in most of the project countries (6 prototypes are currently being tested) (Figs. 5 and 6). Various types of weeder have been tested in Benin, Côte d’Ivoire, and Madagascar (60-96 farmers in each country).

- Development of blueprints for grid/line markers and their fabrication (2 prototypes) (Fig. 7).

- Evaluation of manual transplanters (2 prototypes), seeders (3 prototypes), and motorized weeder (1 prototype).

- The motorized ASI thresher/cleaner was also introduced to improve processing and reduce postharvest losses (Fig. 7).
Through the Agronomy Task Forces, the following crop management decision tools were developed/introduced: (a) Nutrient Manager; (b) recommendations on fertilizer types; (c) an information and knowledge exchange facilitation system (IKEFS), being established at national and community levels, partly through the implementation of an interactive and two-way Hub website; and (d) a cropping calendar for specific rice varieties (Fig. 8). Nutrient omission trials were conducted in eight countries (Benin, Côte d’Ivoire, Ethiopia, Ghana, Madagascar, Senegal, Tanzania, and Uganda) and the Nutrient Manager was validated in Benin, Nigeria, and Senegal. The use of the Nutrient Manager improved rice yields by 1 t/ha in Nigeria (6.5 t/ha with Nutrient Manager compared to 5.5 t/ha using farmers’ practice) and by 1.5 t/ha in Senegal (7.4 t/ha with Nutrient Manager compared with 5.9 t/ha using farmers’ practice (Table 1).

Thirteen automatic weather stations were provided to 10 countries and local staff were trained on their use to facilitate weather data collection. Data collected in each country was sent automatically to AfricaRice for comparative analysis across countries. Based on this data, the following cropping calendar was developed in the various countries (Fig. 8).

<table>
<thead>
<tr>
<th>Table 1. Effect of the use of the Nutrient Manager on rice yields in farmers’ fields in Senegal and Nigeria.</th>
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<tbody>
<tr>
<td><strong>Senegal River Valley</strong></td>
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<tr>
<td>Farmers’ practice</td>
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<tr>
<td>Nutrient Manager</td>
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<tr>
<td><strong>Kano, Nigeria</strong></td>
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<tr>
<td>Farmers’ practice</td>
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<tr>
<td>Nutrient Manager</td>
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</table>
Support to Agricultural Research for Development of Strategic Crops in Africa (SARD-SC), is a multi-national CGIAR-led project, which has the overall objective of enhancing food and nutrition security and contributing to poverty reduction in selected Regional Membership Countries (RMC) in Africa. The target RMCs are: Benin Republic, Cote d’Ivoire, DR Congo, Eritrea, Ethiopia, Ghana, Kenya, Lesotho, Madagascar, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Zambia and Zimbabwe. The project is funded by the African Development Bank and its focus is on raising the productivity and profitability of four commodities; Cassava, Maize, Rice and Wheat. These are four of the six commodities that African Heads of States have defined as strategic crops for Africa, through the Comprehensive African Agricultural Development Programme (CAADP).

The overall objective of the project is to enhance food and nutrition security and contribute to poverty reduction in the Bank’s RMCs. The specific objective is to enhance the productivity of and income from the four CAADP priority value chains on a sustainable basis. In real terms, the plan is to reduce food importation from other continents and offer farmers better access to markets, improve livelihoods and tackle poverty through enhanced capacities of beneficiaries in order to achieve sustainable development for the region.
Adapted mechanization options across the rice value chain

The diagnostic and yield gap surveys identified the need for some level of mechanization of rice production; therefore, the project embarked on the development and testing of locally-developed prototypes of agricultural machinery in target countries. A training workshop was held at the National Center for Agricultural Machinery (NCAM) in Ilorin, Nigeria in December 2013 for 29 trainees (local fabricators of agricultural machinery) from six countries (Ethiopia, Ghana, Nigeria, Rwanda, Tanzania, and Uganda).

The training was linked with the activities of three other projects funded by the Government of Canada (CIDA), the European Union through the International Fund for Agricultural Development (IFAD), and the Government of Nigeria through the Rice Transformation Agenda (RTA). The trainees fabricated five prototypes of the ASI thresher (Fig. 9) and tested them in farmers’ fields. During 2014, the trained fabricators will conduct in-country training of other fabricators jointly with AfricaRice.

After the training at NCAM, Hanigha Nigeria Ltd. (based in Kaduna, Nigeria), one of the trainees, produced its own (cheaper) version of the thresher and is currently fabricating at least 10 more for use by the RTA in on-farm demonstrations. NCAM has also produced a rice thresher (Fig. 10) that combines the principles of the ASI and NCAM threshers but is 98% efficient and costs considerably less than both.

Desfabeng Co. Ltd., another private company that participated in the training at NCAM, has fabricated one ASI thresher (Fig. 11) which was used for in-country training of local fabricators from Benue, Nasarawa, Kano, and Niger states.

Figure 9: ASI threshers/cleaners fabricated by trainees at the National Center for Agricultural Mechanization (NCAM) in Ilorin, Nigeria in December 2013

Figure 10: Rice thresher fabricated by NCAM - it combines the attributes of ASI and NCAM rice threshers, has 98% efficiency and is considerably cheaper than both

Figure 11: ASI thresher with parts fabricated by DESFABENG Co. Ltd.
In a further effort to remove the constraints to rice production and productivity in Africa identified through the diagnostic and yield gap surveys, a training workshop on Integrated Rice Management (IRM) was held at the AfricaRice Sahel Station in St. Louis, Senegal. The objective of the workshop was to strengthen the capacities of rural development agents in rice production techniques. Funding was provided by the SARD-SC project and the Government of Japan (under the Emergency Rice Initiative project).

There were two sessions: one for 25 Francophone trainees (Benin, Côte d’Ivoire, Madagascar, Mali, Niger, Senegal, and Togo) on 4–22 November 2013 and another for 18 Anglophone trainees (Ethiopia, Ghana, Nigeria, Tanzania, and Uganda) from 18 November to 6 December 2013 (Fig. 12).

The workshop combined the exchange of experiences and knowledge among trainees with a series of 11 thematic modules, and included theory and practical laboratory and field work (Figs. 13–15). Pre- and post-training tests were administered on participants to determine what they had learned during the training.

Participants also evaluated the training and made recommendations on how to improve the organization and contents of future training workshops.

Having gained much from the practical training, each trainee will conduct a similar training for at least 60 farmers in his country during 2014. This in-country training is expected to raise the number of farmers with adequate knowledge on the best practices for improving the yield and grain quality of locally produced rice. The training of trainers and the in-country training of farmers will be repeated in 2014 and 2015, respectively.
Figure 14: Trainees learning to identify causes of poor performance of rice plants in the field.

Figure 15: Trainees learning to identify rice weeds and apply pesticides for weed control.
Realizing that the first and most essential input in wheat production is seed of good varieties, the SARD-SC wheat team started with the identification of potentially suitable wheat germplasm and varieties that would fit the prevailing growing conditions in the target countries. These wheat materials are provided to the SARD-SC wheat participating countries, with the largest number of entries delivered from the International Center for Agricultural Research in the Dry Areas (ICARDA) to the hub countries (Ethiopia, Nigeria, and Sudan), as the primary project focus, from which results are obtained.

In the 2013−2014 season, a large number of nurseries and yield trials comprising several hundred wheat entries have been evaluated on-farm and in the research sites by the national SARD-SC wheat team of all project participating countries.

In Ethiopia, two wheat varieties, Adel-6 and Nejemah-14, selected from ICARDA germplasm, were officially released in May 2013 by the Ethiopian National Variety Release Committee (NVRC) for wider use in lowland irrigated wheat agroecologies of Ethiopia. The two varieties were released for their high yield (> 4 t/ha), good grain quality, and acceptable tolerance to heat and salinity stresses. A further three best-performing wheat lines were also identified as potential candidates for the Ethiopian irrigated lowlands and will be put forward for imminent submission to the NVRC in 2014.

In addition, three candidate varieties, suitable for the rainfed highland areas are submitted to the NVRC in October 2013, and the verdict by NVRC is expected in May 2014. The SARD-SC project has been engaged in multiplying seed of those newly released and candidate varieties for quick dissemination and promotion among small-scale farmers of Ethiopia.

The SARD-SC teams have already established six innovation platforms (IPs) in different highland regions of Ethiopia, where they distributed improved seed (77 t) of 5 adapted bread wheat varieties that were planted in an area of 644 ha. The on-farm demonstrations of those varieties were thoroughly monitored, and off-types roughed out to further increase the seed and expand production area and adoption in the coming season. Technical support was provided to farmers during harvesting and threshing to assure seed purity.

In Nigeria, wheat is mainly grown under irrigation in the lowlands of the northern states of the country, where heat is the major stress affecting plant growth and limiting yield. However, germplasm developed at ICARDA and
tested in similar warm conditions of Sudan and southern Egypt provides a real opportunity to select suitable materials for the lowlands of northern Nigeria.

About 246 entries emphasizing wheat productivity under low-latitude, warm, irrigated conditions were sent to Nigeria where they have been grown in sites within Borno and Kano states. Fifty-six entries were identified as promising and selected for confirmative yield testing in the coming season. Additional testing of more advanced materials led to the identification of several breeding lines with yields of over 5 t/ha, a very promising result, given that the national average yield does not exceed 2 t/ha.

Demonstration plots of promising wheat breeding lines and varieties combined with proper crop management were established at irrigated lowland sites, resulting in higher grain yield as compared to the usual farmer practice. In particular, bread wheat varieties, Norman and Reyna-28, showed excellent performance with yields of 7 t/ha and 6 t/ha, respectively, and are therefore proposed for release in 2014.

The Nigerian team has shared a few kilograms of these varieties with other SARD-SC project target countries (Mali, Mauritania, and Niger) in 2013 for large plot demonstration in farmer fields of those countries. Three other varieties are also identified by the Nigerian team as candidate varieties with a yield of around 6 t/ha, and will be submitted for release in 2015.

Accelerated seed increase of these varieties, a key to their quick dissemination and adoption, is enhanced through the established IPs and the training of farmers on rapid on-farm seed production. Accordingly, a total of 40 t of wheat seed was distributed across the IPs established in Kano and Borno states, reaching over 560 farmers. The Project continues to promote and support seed production to make available to farmers seed of the improved wheat varieties in the shortest time possible.

In Sudan, wheat faces the depressing challenges of both heat and diseases that keep yield at a low (2–2.5 t/ha) level, barring wheat from the list of economically competitive crops. Recent research advances resulted in well-adapted cultivars yielding 4 t/ha or above, which is changing farmers’ attitude towards wheat cropping.

The SARD-SC wheat is contributing to further improve wheat productivity at the farm level, through multi-environment testing, on-farm demonstrations, and efficient seed production. In 2013–2014, over 3800 wheat entries from the national program and international nurseries were evaluated on-station at 46 sites and in farmers’ fields across the country to assess their productivity and tolerance to heat stress and prevailing rust diseases.

Intensive testing led to the confirmation of superior wheat varieties ElNeilain, Bohaine, and Imam with yields of 4–5 t/ha when grown under proper crop management, versus 2 t/ha for those grown under traditional farmer practices. A new bread wheat variety, Goumria, was released in 2013, based on its high yield, good grain quality, and tolerance to heat and diseases.

Production of breeder seed, and pre-basic seed was undertaken for seven released varieties on 10 ha, while accelerated pre-release seed multiplication was performed for nine promising variety candidates on 2.25 ha to assure a sufficient amount of seed for further demonstration and dissemination of these varieties among wheat growers in Sudan in the coming 2014/15 season.
Wheat value chain

From a technology focus to innovation development: Success stories and field days in wheat IP sites

SARD-SC wheat in ICARDA is currently working in 12 African countries to bring transformational impact through adapting/generating, demonstrating, and promoting proven technologies with the participation of stakeholders along the value chain using an innovative approach.

Although the country’s present average wheat yield at the farm level is only 1–2 t/ha, recent activities through the SARD-SC wheat program in project participating countries revealed that productivity can be dramatically boosted with a yield increase of 4–7 t/ha or more, if improved varieties are used, along with recommended management options.

Wheat teams of the SARD-SC Project in all participating countries work closely with farmers, extension services, researchers, and a number of other stakeholders, depending on the country, in their efforts to addressing the needs of all stakeholders of the wheat value chain, and therefore meeting the ultimate objective of enhancing domestic wheat production and curbing expensive imports.

Project launching workshops, work plan development events, sensitization meetings, and direct and electronic communication are all tools used to reach this objective.

However, field days organized towards crop maturity proved most effective in bringing together the largest number of various stakeholders, including farmers, researchers, extensionists, creditors, input providers, wheat processors, end-users, and most importantly, policy makers. During the past year, SARD-SC wheat held a series of field days and technology promotion events mainly in the three project hub countries and to a certain extent in other partner countries.

Field day and technology promotion event in Nigeria

In Nigeria, the SARD-SC Project held a wheat field day on 11 March 2014 at Kadawa, Kano State under the patronage of the Honorable Minister of Agriculture and Rural Development, Dr Akinwumi A. Adesina, with the participation of over 500 stakeholders, including senior government officials, parliamentarians, farmers, extension specialists, researchers, NGO representatives, input suppliers, millers, and invited guests from ICARDA and project partner neighboring countries (Mali, Mauritania, and Niger).

Alluding to the increasing trend of importing wheat into Nigeria, presently valued at 4 billion US dollars, and to the encouraging field results achieved through the SARD-SC Project in Nigeria, the Minister confirmed Government commitment to enhancing wheat production through favorable policy.

This will guarantee minimum wheat price, subsidized inputs, and other incentives to make wheat a competitive commodity, which will reduce imports, and create jobs and wealth in the rural areas of Nigeria. He thanked the African Development Bank (AfDB) for funding the SARD-SC Project, and expressed his appreciation of the contributions of both ICARDA and the International Maize and Wheat Improvement Center (CIMMYT) in the promotion of wheat technologies in Nigeria.

Dr Akinwunmi Adesina, Nigeria’s Minister for Agriculture (Center), has placed the improved varieties at the center of a national wheat enhancement program.
The Minister indicated that the target of the Nigerian government is to increase national wheat production from the present 300,000 tons to 1.5 million tons by 2017, thus reducing wheat imports by half. In addition, the “Wheat Transformation Agenda” will create one million jobs in the rural areas of Nigeria over the next four years. All participants to the field day warmly welcomed the Minister’s speech and firm government support to enhancing domestic wheat production.

Dr M. El Mourid, speaking on behalf of ICARDA Director General, expressed ICARDA’s great satisfaction and appreciation of the collaborative work with the Nigerian SARD-SC Team, and pledged further ICARDA support to this partnership. The Honorable Minister led Nigerian dignitaries and other invited field-day participants on a tour through the research and farmer wheat fields at Kadawa where they observed and commented on the impressive field performance of improved wheat varieties in farmers’ fields as well as research testing sites.

Field day and technology promotion events in Ethiopia, Sudan, and other SARD-SC partner countries

In Ethiopia, a series of field days were organized in the highlands of four regional states (Tigray, Amhara, SNNP, and Oromia) during October and November 2013, bringing together several thousand participants. These field days offered a valuable opportunity to the participants for a fruitful exchange of experience and information on the new technologies being promoted by the SARD-SC teams. Many stakeholders attended these field days, including farmers, researchers, extension agents, and representatives of local authorities.

Farmers were extremely impressed by the performance of demonstrated varieties and cultural practices that contrasted with the local practice, especially with the present SARD-SC wheat initiative where improved technologies are used with an optimum package in a new set up of partnership. Farmers are able to realize wheat yields of up to 5−7 t/ha versus 2 t/ha for farmers’ old practice in these areas. All participants were eager to participate in SARD-SC innovative dissemination and scaling up activities.
Wheat value chain
In Sudan, 18 field days were organized at six IP sites within four states (Northern State, River Nile State, Gezira State, and Kassala State) with the participation of over 3000 stakeholders, including high-level officials (HE, the Federal Minister of Agriculture, Governors of different states, ICARDA officials) policy makers, farmers, financing institutions, input providers, agricultural scheme managers, researchers, extension workers, and the media. These field days provided an opportunity for fruitful interaction among stakeholders and demonstrating high performing technologies, including high yielding varieties and variety candidates.

Field days in SARD-SC wheat partner countries:
In particular, a field day was organized in Niger on 12 March 2014 at INRAN research station near Agadez, over 1000 km north of Niamey. The field day was inaugurated by the local Governor, with participation of 125 farmers (including 40 women). A presentation of the SARD-SC project and its objective was made by the Agriculture Research Institute of Niger (INRAN) scientists, following which the participants went through the wheat field and made their own selection among the potential varieties that were demonstrated by the national SARD-SC wheat project. A number of farmers showed a keen interest to grow wheat on their farms in the coming years.
The Local Governor inaugurated a wheat field day at Agadez, Niger, organized by INRAN and the local authorities, March 2014.

In Zimbabwe, five field days were conducted at five sites by the national SARD-SC wheat team in collaboration with the Crop Breeding Institute and Agronomy Research Institute during the 2013 wheat cropping season, with the objective of exposing the farmers to new improved wheat technologies. The sites included Chelesile in Matebeland South, Chibuwe in Lowveld, Cashel Valley in Manicaland, Chinhoyi in Mashonaland West, and Bindura in Mashonaland Central.

A total of 1245 (837 males and 408 females) stakeholders including farmers, extension officers, private seed companies, and local administrators attended the field days across all sites.
Building on the IP approach for transformational impact on wheat commodity

The central development question in African agriculture is how to catalyze a more competitive, equitable, and sustainable agricultural growth within the context of smallholder production systems, inefficient agricultural marketing, and inefficient investments by the private sector amidst a degradation prone, natural resource base.

In line with the overall goal of achieving transformational impact through the SARD-SC project, emphasis is being placed to moving beyond the usual triad of farmers, extension, and research institutes through embracing an integrated agriculture research for development (IAR4D) approach based on an innovation systems framework.

The concept emphasizes that the generation, diffusion, and application of impactful innovations critically depend on systemic integration of knowledge systems that promote communication, interaction, and cooperation between agricultural research, education, extension, farmers, the private sector, and policy regulatory systems.

Based on successful experiences at the Forum for Agricultural Research in Africa (FARA) and other institutions, the SARD-SC wheat project has adopted the innovation platform (IP) as an efficient framework for the Integrated Agricultural Research for Development (IAR4D) of the wheat value chain in participating countries.

Therefore, a training workshop on “IAR4D and Innovation Systems Approach for SARD-SC Wheat Value Chain” was held in each of the three hub countries (Nigeria: 28–30 August 2013, Ethiopia: 3–5 October 2013, and Sudan: 21–23 December 2013).

The purpose of the workshops was to strengthen the capacity of SARD-SC stakeholders in the wheat value chain, in understanding the process...
and skills for the application of the IAR4D concept for generation of innovation, and for setting up and operating of the different IPs in the three hub-countries along the wheat value chain.

The workshop in each of the three hub countries was attended by around 55–60 wheat value chain stakeholders and key representatives largely drawn from research, federal and regional agricultural extension offices, universities, parliamentarians, regional administrations, seed producers, farmers unions, microfinance institutions, and flour millers.

In each of the organized workshops, the agenda included presentations by a senior facilitator from FARA, a question-and-answer session, working group sessions, and plenary discussions on wheat research for development, challenges, and priorities in the target hub country, with some references to partner countries in general.

These training workshops enabled participants from project target countries to have a good grasp of the following key outputs: (a) a better understanding of the IAR4D approach as applied through the IP for the wheat value chain, (b) the needed skills to work interactively on an IP and (c) initiation of the set-up and operation of IPs in participating countries.

The training workshop was highly interactive with full and active participation of all stakeholders. The stakeholders unanimously appreciated the concept of the IP approach as an effective forum for multi-stakeholder participation in jointly diagnosing challenges and devising sustainable solutions for generation of innovation and impact along the wheat value chain.

Finally, the workshop was concluded by setting clear sharing of responsibilities among stakeholders with defined timelines for successful establishment and operating of the six IPs in each of the three hub countries. The participants also discussed the details of the operations of the IPs, including the setup of IP governance and management framework; and the implementation of the business plan, along with a monitoring and evaluation process throughout the seasons.

The plan was made for each of the target regions in Nigeria, Sudan, and Ethiopia. It was indeed impressive to witness the high level of commitment shown by all wheat value chain stakeholders and platform facilitators to successfully implement and scale up the planned SARD-SC wheat research for development activities in the coming years.

All in all, this training workshop created a new wave of positive spirit among stakeholders so that, through collective action and partnership, it is possible to reverse the status quo of wheat importation and achieve a transformational impact for Africa to feed Africa within the foreseeable future.

The workshop participants expressed their highest appreciation to AfDB for funding the SARD-SC project, and to ICARDA and FARA for bringing such a proven innovative approach to scale up and sustainably promote wheat production, processing, and marketing in the African context.
A training workshop on IP approach for SARD-SC Wheat value chain stakeholders in Sudan and representatives from two East Africa Lowland project partner countries, December 2013
## Project Steering Committee Members

<table>
<thead>
<tr>
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