



SARD-SC

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Development of Strategic Crops in Africa

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Africans unite to galvanize youth into agribusiness for continental development



IITA Director General, Dr Nteranya Sanginga with other eminent personalities at the workshop.

The International Institute of Tropical Agriculture (IITA) Ibadan, with the Support for Agricultural Research for Development of Strategic Crops (SARD-SC) in Africa project and Alliance for Green Revolution in Africa (AGRA) held a two-day workshop on *Engagement of Youth Entrepreneurship for Agricultural Transformation in Africa*, from 28-30 May at IITA, Ibadan, Nigeria.

The workshop brought together almost 200 participants from about 20 countries, including policy makers, donors- African Development Bank (AFDB), Bill and Melinda Gates Foundation (Gates Foundation), International Fund for Agricultural Development (IFAD), Alliance for a Green Revolution in Africa (AGRA)- non-governmental organizations, CGIAR, youth groups from different countries, regional research organisations and the National Agricultural Research and Extension Systems (NARES) in Africa.

The workshop came into being to tackle the issue of youth unemployment in Africa, with over 70% of the

population between 15 and 24 years in many countries are either unemployed or under employed. The participants brainstormed on how to develop a Pan-African Youth in Agribusiness program, whereby youth can be engaged in agricultural entrepreneurship to ease the burden of unemployment while ensuring food security.

The event had a number of papers delivered by representatives/ Ministers of Agriculture of several sub-Saharan Africa countries; heads of potential funding institutions; and partners in African agriculture development such as FARA and other sub-regional research organizations.

The Director –General of IITA, Dr. Nteranya Sanginga, in his opening remarks reiterated the importance of the novel idea of engaging the youth in agribusiness as one of the ways to

solve the high rate of unemployment and contribute to enhancing food security in Africa. He described unemployment as a time bomb waiting to explode, with subsequent socio-economic implications that may be difficult to contain in many countries.

The event supported by the African Development Bank, (AFDB) through the SARD-SC project, had a good representation of its top management staff. Dr. Chiji Ojukwu, Director, Agriculture & Agro-Industry Department, African Development Bank, said the Bank was pleased to be associated with IITA 's initiative to advance youth employment in agriculture and Agribusiness in Africa, "because unemployment in general, and youth unemployment in particular, is becoming a serious challenge to African countries, development planners and institutions."

Ministers of Agriculture from Guinea Conakry, Ghana, Mali, Tanzania, DR Congo sent good will messages to the participants, while Nigerian Minister of Agriculture, Dr. Akinwunmi Adesina gave a speech on youth issues and challenges and pledged a donation of 500,000 dollars to support the IITA program on engaging the youth in agribusiness.

A communique was issued at the end of the workshop.



A cross section of the youth agripreneurs.



AfDB





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Cassava processing factory established at Kalambo, DR Congo

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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.

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.

The launching of the factory attracted 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.

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. Mr. Chisambo pledged his continuous support to IITA and the project for the important agricultural development they have brought to his province.

The Director –General of IITA, Dr. Nteranya Sanginga was visibly elated by the construction of the factory and culinary innovations that have spawned the many different cassava products introduced into DR. Congo, during the launching. Through the tutelage of Mr. Samiran Mazumdar, Head, Hotel and Catering Services, IITA, Ibadan, he showed the several culinary delights that can be made from cassava and soybean flour. The importance of processing agricultural produce, he emphasized, was for value added as means of reducing importation, creating employment opportunities and raising national revenue.

Some of the visitors 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.

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, Cassava Strips, Cassava Sausage Rolls, Cassava Meat pie, Scrambled Tofu, Tofu Kebab, Cassava Biscuits, and other confectionaries made from soybean flour.

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The exhibition center of the factory.

Project Coordinator visits sites to evaluate project activities in Tanzania

In order to ensure the smooth implementation of the cassava value chain program of the SARD-SC project in Tanzania, Dr. Chrysantus Akem, SARD-SC project Coordinator, made a one week visit to inspect activities in the country where the project is being implemented through the IITA and its National Agriculture Research and Extension System (NARS) partners.

Dr. Chrys Akem visited the coast region in the Mkuranga district, Lake Zone Agricultural Research and Development Institute (LZARDI) Ukiriguru, Mwanza and Kigoma district where he inspected various project sites during his one-week stay in Tanzania. The one week visit started on 5th May 2014, he visited the project's cassava agro trials located in the Mikochei Agricultural Research Institute (MARI) sub-station, in Mkuranga district, in the company of Dr Abass Adebayo- SARD-SC Country coordinator, Dr Veronica Uzokwe- Cassava Agronomist and Mr. Frederick Ntagwabira- Consultant. The station manager, Mr. Samuel Mgema and Mr. John Msemu, representing Root and Tuber/Sugar Cane Research (SRI) Kibaha, one of the project's collaborating Institutes, welcomed the team to the MARI sub-station and took them on a tour of the station.

... Visit to Lake Zone Agricultural Research and Development Institute (LZARDI)



The SARD-SC team visited the Lake Zone Agricultural Research and Development Institute (LZARDI) Ukiriguru, Mwanza and met with the LZARDI partners, Drs. Jeremiah Kulembeka, Heneriko Kulembeka, Deus Mlay and Theresia Ngendello.

Dr. Akem presenting some SARD-SC promotional materials to Dr. Elmes Kaboni

...Visit to Kigoma: Kibondo, Kakonko, and Uvinza

The SARD-SC team arrived Kibondo the next day Friday 9th May and visited the Kibondo Big Power Group (KBPG). The KBPG consists of various stakeholders including farmers, processors, etc across the cassava value chain.

The KBPG is the biggest group of cassava producers in Kigoma, its leader is Mr. Kennedy Salundari. The group has more than 20 members with few women, holding about 350 acres of

planted cassava.

Dr. Akem was highly impressed with the KBPG for the 10 acres elite cassava variety multiplication plots they have set up in partnership with the SARD-SC team.



Mr Kennedy discussing the challenges farmers experience in cassava production



Mr Selunze discussing with project coordinator and members.

Dr. Akem inspected one hectare multiplication plot of elite cassava varieties established by IITA/SARD-SC team and NARES partners. Afterwards, the team proceeded to the small scale cassava processing centre, Ukaya farm, Mkuranga district where one of the unreplicated on-farm fertilizer trials was set up. The team later moved to the processing centre where Dr. Abass explained the process of turning cassava into different products, uses and management of various equipment such as flash drier. He also discussed the challenges encountered by the processors and how to ensure high quality cassava flour (HQCF) production in Tanzania.

The teams then moved on to another

village-Kikoo, where the agro-trial and farmers characterization plot were set up. One of the farmers managing the on-farm trial and characterization plot, was Mr. Said Selunze, who coordinates the 3 on-farm and 10 farmers plot in Kikoo.

Subsequently, the SARD-SC team visited another small scale processing center at Visiga in Kibaha district, where Dr Abass explained the mechanism of the Drier which dries cassava. The plant development and the whole process impressed the coordinator.

...Visit to Agromats Multiplication field in Uvinza

The SARD-SC monitoring and evaluation team, visited one of the project's SME partners, the Agromats Company, in Uvinza, Tanzania. The CEO of the company, Mr. Abdul Mwilima (a motivated Kigoma indigenee who wants to establish HQCF and starch processing factory), received the team. Agromat company has started with one hectare of multiplication plot and will distribute the planting materials to outgrowers freely in order to multiply them. The idea is to have a reliable and a continuous supply of cassava for the factory and as well increase the income and productivity of the cassava smallholder farmers in the environs.

Team visits the Regional Commissioner Office, Kigoma



Dr Akem visiting the regional commissioner of Kigoma

The team also so far. He also revealed plans to mechanize paid a courtesy agriculture in the 6 District Councils call to the of Kigoma Region [Buhigwe, Kibondo, Honorable Kakonko, Kibondo, Kigoma and Uvinza) by Commissioner 2015. for Kigoma In his remarks, Dr Akem said he was Region, Hon impressed by what he has seen in Kigoma Lt Col Issa Region and believed the relationship Machibya. between IITA , Regional Government T h e and private stakeholders are a recipe for honorable RC success of the program., appreciated The High commissioner commended the the team visits in SARD-SC team for a good job well done and Kigoma and the urged the project to establish a cassava good work done research center in Kigoma

Consumers laud value added cassava products in Sierra Leone

In their contributions to the Smallholders Commercialization Program (SCP) of the Ministry of Agriculture, Forestry and Food Security (MAFFS), the International Institute for Tropical Agriculture (IITA) with support from the United States Agency for International Development (USAID) have constructed and equipped 11 cassava processing factories for Farmer Based Organizations groups in the eastern, southern and northern provinces of Sierra Leone. With additional support from the African Development Bank (AfDB) through the SARD SC project, IITA is establishing 4 more factories in the country.

Cassava factories

The factories are already producing a number of value added products on a small scale and are eager to go into commercial production of the products. It is in this regard IITA undertook a consumer survey of four (4) new cassava products the institute has introduced in the country: odorless fofofo flour, attieke/cassava couscous, tapioca pap and cassava ice cream made from High Quality Cassava Flour.

Consumer survey

Ms Ibrinke Popoola, from IITA Ibadan Office, led the survey exercise under the guidance of Dr. Bussie Maziya-Dixon, head of IITA's Crop Utilization Unit in Ibadan, Nigeria. Ms Popoola stressed that public perception, acceptance and recommendations are critical for cassava factories to improve the quality of the four new products they intended to put on the market on a large scale.

Assessment

The study started in Freetown by 10 IITA-trained enumerators working in five teams of two each administering key survey questionnaire to individuals. The enumerators (all women) were drawn from MAFFS-Women in Agriculture and Nutrition Division, Young Women

Christian Association (YWCA), Home Foods and Drinks SL 9Ltd), Vickam Enterprises/St. Mary's Vocational Training Institute in Bo, Independence Memorial Secondary School, Freetown and IPAM of the University of Sierra Leone. The survey targeted 300 people per product in 10 public/market communities.

The enumerators evaluated target community opinion on odourless fofofo flour as a new value added product compared to the traditional dry and wet balls fofofo. They later assessed attieke/ cassava couscous as a new value added product compared to existing attieke made from gari; and thereafter assessed the new Tapioca pap (cassava-soybean blend) compared to existing blended pap. The survey ended within a week by assessing vanilla-floured cassava ice cream made from High Quality Cassava Flour and another from cassava starch compared to available vanilla-flavoured ice cream from supermarkets. "We evaluated new cassava products promoted by IITA against existing ones already known by the public in Sierra Leone," explained Popoola.

The five teams carrying out the survey were supervised by IITA staff. "We are with the survey groups to ensure that the enumerators adhere to questionnaire delivery and data collection methods in order to get quality data," explained Mamako Demby, IITA's Post-harvest technician in Sierra Leone.

The survey was widely accepted by the public. Most of the respondents said it was their first time of seeing the new products, especially the powder form of fofofo. The teams indicated that whilst the people generally appreciated the appearances, texture, smell and taste of the new products and expressed willingness to buy them, sustained sensitization and education about the products was highly needed for the public to know about their nutritional value, kitchen-labour saving advantage, convenience and availability.

Mrs. Popoola noted that the exercise would provide marketing information for small and medium scale companies that wish to go into commercial production of the new products.



IITA official conducting a survey on cassava products.

A training workshop held on formation of effective cassava value chain Innovation platform in Tanzania

The SARD-SC project team in Tanzania, in collaboration with the socio-economic team from IITA, Cotonou, Benin Republic trained key actors on Cassava Value Chain (CVC) Innovation Platform (IP) formation, in Tanzania. The major goal of the training was to establish an effective and functional CVC IPs with all the active stakeholders in the SARD-SC project zones.

Stakeholders from different locations in the project areas such as East Coast-Mkuranga, Zanzibar; Dodoma, and Kigoma-Kakonko, Kibondo and Uvinza attended the two day training from July 15 to 16, 2014. With about 50 participants in attendance, the training was in two parts, the first one focused on theoretical aspects to teach participants on Innovation Platform formation in CVC, while the second one was based on practical demonstration.

The facilitators were Mr. Brice Gbaguidi and Mr. Remy Ahoyo from IITA, Benin Republic. They trained the participants on the formation of Innovation Platform in cassava value chain. Mr. Gbaguidi explained key concepts under the IPs, their importance in cassava value chain and the process of formation.

In addition, Mr. Ahoyo introduced other key and important concepts under the cassava value chain, such as facilitation, coaching and mentoring and explained the circumstances under which each of them works. In his presentation, Gbaguidi described the four types of IP, as Institutional, marketing, policy and technological. The institutional IP deals with rules, culture, values, norms, behavior, policies/governance and laws while Technological IPs embrace the



Participants at the Cassava Value Chain Innovation Platform formation training

IAR4D principle, which entails organizing and delivering knowledge in new ways. The facilitators made a clear cut distinction between an Innovation Platform and a cooperative society; Innovation Platform involves various stakeholders under one platform, while a cooperative society has the same stakeholders in a platform.

They also addressed some of the major challenges in establishing Innovation Platforms in sub-Saharan African countries, which include lack of credit and viable business environment, and large number of scattered small producers. The participants understood various ways in which the involvement of stakeholders in cassava value chain benefit the general process from farming to reaching the consumers and the advantages of Innovation Platforms for identifying bottlenecks and opportunities in production, marketing and the policy environment.

Dr Veronica Uzokwe, SARD-SC project Agronomist, in Tanzania, gave a presentation on the *Need to Make Cassava an Industrial Crop in Tanzania*. While explaining the reasons for the choice of Kibondo district for the location of the training, she said the use of 'Bottom-up-Approach, for the training has a lot of advantages because it entails participation of all stakeholders from the farmers at production level to the consumers as well as producers in cassava supply chain and other actors such as the input suppliers, processors, marketers, government, including the policy makers, researchers and many others

right from the beginning.

In her remarks at the opening of the training session, the Assistant Executive Director of Kibondo District, Mama Honoratu Kabunduguru, expressed her gratitude to the SARD-SC project for choosing Kibondo district for the training. She emphasized the need to improve on food security and the potential of cassava as the second most important crop in Tanzania.

Kibondo district in Kigoma region of Tanzania was chosen as the venue for the training because the project uses a "Bottom-up-Approach" where training is conducted at the grassroots and impact environment levels to tackle the CVC challenges in the country. In addition, Kigoma is one of the food baskets of Tanzania, bordering most of the neighboring countries like DRC, Burundi and others, which will strengthen the marketing potential of the CVC and economic growth of the nations.

On the second day of the training, participants visited one of the partners of the SARD-SC project trials at Kibondo, the Kibondo Big Power Group(KPGP). The group is a major producer of clean planting materials



Honoratu Kabunduguru speaking at the CVC IP training



Dr. Juma kayeke making a contribution

Multi-Stakeholder Platforms employed for skills enhancing training of rice value chain actors

Through support of the rice component of the SARD-SC project and in collaboration with the Realizing the Agricultural Potential (RAP) of inland valley lowlands in sub-Saharan Africa project, the AfricaRice Task Force on Policy, Innovation systems, and Impact assessment organized a Knowledge-Skills-Attitude (KSA) training for rice stakeholders to facilitate functional Multi-Stakeholder Processes (MSP) in rice value chains. Fourteen national rice stakeholders including five women from Benin, Côte d'Ivoire, Ghana, Madagascar, Sierra Leone, and Uganda were trained by the International Center for Development-Oriented Research in Agriculture (ICRA) and they shared experiences with one another. The hands-on practical training focused on KSA methods and tools and the adaptation of MSP facilitation processes in country-specific rice sector development hubs. This competence and skills enhancing

training of rice value chain actors took place in the Glazoué rice sector development hub in the Republic of Benin from 24 to 27 June 2014.

The establishment and functioning of the MSP in the rice hubs is a complex process that requires intensive and systematic support and training of key actors. In order to successfully set up and facilitate MSPs, coordinators and facilitators of MSPs should be adequately equipped with skills and competencies through learning-by-doing. Thus, the competence

and skills enhancement of the country MSP facilitators and platform actors are enhanced through the systematic use of a Learning for Innovation (L4I) cycle shown in Figure 1.

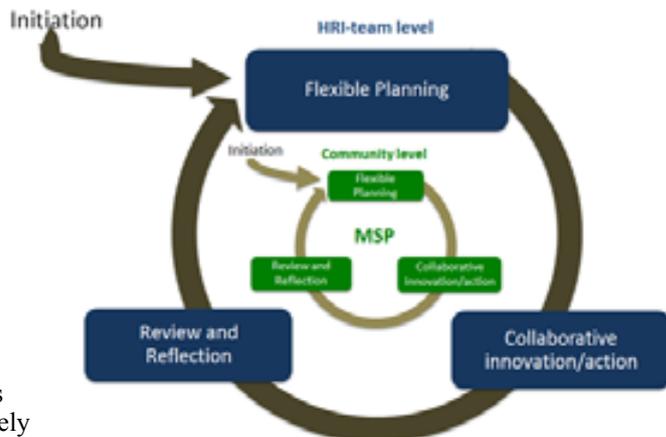


Figure 1. Learning for Innovation (L4I) cycles at hub and community levels.

Local fabrication of Asi thresher prototypes commences in Nigeria, enhances availability

Hanigha Nigeria Limited, Kaduna, Nigeria, participated in the ASI thresher fabrication training supported by the SARD-SC rice component of the project, as well as the training on the use and maintenance of power tillers, their attachments, and reapers through AfricaRice. Hanigha Nigeria Limited was one of the 30 local manufacturers trained on the fabrication of the Asi thresher/cleaner at the National Center for Agricultural Mechanization (NCAM), Ilorin, Nigeria, in 2013. As a result of the training, the company has started in-

country fabrication of the Asi thresher equipment for threshing rice.

The Company's Chief Executive Officer, Mr Charles Frimpong speaks of the training: "We are working very hard to ensure we are able to put into practice, the experiences gained from these activities. Our skills have been enhanced and we have successfully fabricated 10 ASI threshers named ATA-Threshers for use in Nigeria's Rice Transformation Agenda. Of these, five were bought by AfricaRice; two by Imam Integrated Farms, Musawa,

Katsina State in Nigeria; one by Mohammed Abdul-Kura Farms, Kura, Kano State, Nigeria; and the remaining two are available for sale. We also participated in the training of other local artisan fabricators of the ATA-thresher organized by the National Cereals Research Institute and Desfabeng Nigeria Limited. We are thankful to AfricaRice for the opportunity given to our staff to partake in the activities mentioned above. Our company Hanigha Nigeria Limited is happy with the collaboration with AfricaRice".



ATAT (ASI) threshers fabricated by Hanigha Nigeria Limited

Rice parboilers improved to enhance rice quality and for technology dissemination

The AfricaRice Postharvest Task Force has assessed improved parboiling vessels from Benin, Cameroon, and Ghana and one of these parboilers originally from Cameroon has been further improved at AfricaRice and the new GEM parboiling technology has been selected as a scalable technology. The GEM parboiling technology is currently undergoing validation trials at AfricaRice and will be further tested in the countries.



Photo 2a. A multi-piston briquetting machine developed at AfricaRice Center

Furthermore, a multi-piston rice husk briquetting machine (Photo 2a) that releases nine briquettes at once has been developed at AfricaRice. This machine produces three types of briquettes: husk, husk-bran, and husk-bran-palm press fiber briquettes (Photo 2b). Husk-bran mixtures came from Engelberg type mills while husk alone came from Rubber roll type mills. Trials on burning rates and energy



Photo 2b. Drying of briquettes at ambient conditions to moisture content of 20%.

efficiencies (Photo 2c) are ongoing. In collaboration with the NGO SNV, different types of gasifier stoves that use husk for energy generation have been acquired and studies are ongoing on these stoves (Photo 3). These energy and environmentally friendly vessels can be viewed at <http://www.ricehub.org/RT/post-harvest/parboiling/improved-parboiling-technologies/gem-parboiling-technology/>



Photo 2c. Briquettes burning in a well-ventilated stove

Facilitating information and knowledge exchange to engender rapid out-scaling of innovations in rice sector

Information and knowledge is most effectively shared through face-to-face interaction but large numbers of people will benefit if this is combined with multimedia platforms, including visual access, video, radio, and print. The Rice eHub www.riceHub.org established by AfricaRice is such a multimedia platform enabling beneficiary countries and stakeholders to share technical and institutional innovations that are making a positive change in the rice value chain. It's for this reason that 14 national experts including four women involved in communication, ICT, and knowledge management from Benin, Côte d'Ivoire, Niger, Sénégal, Ghana, Nigeria, Sierra Leone, Ethiopia, Tanzania, Uganda, and Madagascar met at the AfricaRice station in Cotonou, Benin from 25 to 27 June 2014 to learn and share experience on information and knowledge management for enhanced rice sector development through the Rice eHub www.riceHub.org.

The purpose was to facilitate information and knowledge exchange between public and private sector actors on rapid out-scaling of successful innovations and feedback on research. The learning workshop enabled participants to discuss the use

of video and rural radio to report on work with farming communities and to document scalable technologies taking into account local socioeconomic conditions. Rural radio will be used to inform and educate the rice community throughout the cropping season, by advising on crop management practices and sharing experiences among value chain actors.

Each country is advised to develop a

“rice knowledge management package” which combines video, rural radio, use of the Rice eHub, printed material, billboards, etc. that best match their resources and priorities. Based on these country action plans, partners such as Farm Radio International and Digital Green will provide technical support to ensure that the selected tools facilitate information and knowledge exchange with large numbers of end-users.



Participants at the workshop held in Cotonou, Benin

Wheat commodity value chain trained NARS Accountants from project countries

The Wheat commodity value chain organized a 3-day training workshop for NARS accountants drawn from eleven project participating countries (Ethiopia, Eritrea, Kenya, Mali, Mauritania, Niger, Nigeria, Sudan, Tanzania, Zambia, and Zimbabwe) in Hammamet, Tunisia from 25 to 17 June 2014.

The main objectives of this training workshop were:

- To have a good understanding of AfDB wheat project finance and procurement procedures.
- To correctly apply AfDB financial and procurement procedures in their respective countries.
- To familiarize themselves with the financial and procurement reporting format of the SARD-SC Wheat Project.

During the workshop, presentations were delivered by the wheat value chain Procurement Specialist, Khaled Essaidi, on procurement procedures for goods, work, or services as required by AfDB. He further explained and shared the various templates needed

for Purchase Requests (PR), Quote Comparison Matrices, Purchase Orders, and Goods/Services Delivery Receipt.

The accountant of the value chain, Hammani Hichem, made presentations on procedures for fund disbursement and reporting templates. He further expressed the details of the two financial reports as required under this project: (1) an Interim Quarterly Financial Report (2) and an Annual Financial Report. The workshop was deliberated in a participatory and interactive way and a group session was organized for

participants to work on and present an example of a financial report as required by AfDB using the right templates.

Finally, the participants from 11 NARS unanimously expressed their appreciation to the project for organizing such a highly informative and practical training workshop. They stressed the training course enabled them to better understand and internalize the financial and procurement procedures as well as the various reporting formats of AfDB. They also promised to improve the quality and timeliness of reporting in the future.



Group picture of NARS accountants at the SARD-SC Wheat Commodity Training Workshop for Accountants

Annual technical review and planning meeting held to evaluate progress

The wheat commodity value chain of the SARD-SC project 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.

The SARD-SC Wheat Project organized its annual review and planning meeting with the purpose of evaluating the progress/achievements made during the 2013/14 season and to

jointly discuss, prioritize, and agree on the plan of work for the 2014/15 season in each of the 12 project target countries. Accordingly, the first annual review and planning meeting comprising the six highland hub project participating countries (Ethiopia, Kenya, Lesotho,



Group picture of wheat commodity value chain members.

Tanzania, Zambia, and Zimbabwe) was held from 30 April to 2 May 2014, in Addis Ababa, Ethiopia. Following that, a similar annual review and planning meeting for the remaining six East and West African Lowlands project target countries (Eritrea, Mali, Mauritania, Niger, Nigeria, and Sudan) was organized in Khartoum, Sudan between 16 and 19 June 2014.

In each of the events, about 55 participants attended the meeting, including researchers, extension workers, farmer representatives, seed production specialists, and representatives from credit associations, agroprocessors, and NGOs.

During the opening sessions both in Ethiopia and Sudan, the meetings were opened by the senior policy makers who officially lauded what they called the “invaluable contribution” of ICARDA and SARD-SC Wheat to the promotion of improved wheat

technologies and the dedication and hard work of SARD-SC wheat team members, participating farmers of both countries, especially through the Innovation Platforms (IPs) that proved highly effective in bringing farmers in close contact and positive interaction with researchers, extension personnel, and other key stakeholders along the wheat value chain. They also thanked the African Development Bank (AfDB) for funding the SARD-SC project to promote the production of wheat across African countries.

In the opening ceremony in Sudan, the Honorable Minister also honored 82 progressive farmers selected across the six SARD-SC wheat IP sites for their successful application of the improved wheat technology with average yields generally ranging from 4 to 6 t/ha under heat-prone environments.

During the two annual review and planning meetings, the project

teams of all 12 countries have successfully reviewed the progress and achievements of the 2013/14 season by component and country, and also jointly developed the plan of work (PoW) focusing on the three major project components (technology generation, technology dissemination, and capacity building) for the upcoming 2014/15 season.

These two annual meetings enabled project participants to learn and share their best experiences among themselves. Based on the 2013/14 successful experiences of the three hub countries in promoting wheat technologies at the IP sites, all the nine project partner countries have also included in their 2014/15 PoW to establish and operationalize at least one IP each, for promoting best-bet wheat technologies in partnership with relevant stakeholders along the wheat value chain.

Capacity building program held for scientists on classical and molecular approaches in wheat breeding

As part of the ongoing capacity building program of ICARDA, the SARD-SC Wheat project organized a training course on “Classical and molecular approaches in wheat breeding” in Morocco from 7 to 25 April 2014. Participants were early to mid-career researchers involved in wheat breeding or related disciplines. A total of 23 trainees drawn from the 12 SARD-SC wheat project target countries (two per country, except for Mauritania from which only one researcher could participate) participated in the training course.

The objective of the course was to provide the trainees with technical knowledge and know-how on wheat improvement (using both conventional breeding and molecular-based techniques) to develop wheat varieties that are high yielding, adapted to local growing conditions, and possess good end-product quality. The course included both lectures and practical field and lab sessions offering the trainees an opportunity to learn and practice breeding procedures for

the improvement of wheat yield, tolerance to biotic (e.g., diseases and insect pests) and abiotic stresses (heat and drought), and of wheat end-product quality.

During the course trainees attended the 21st Biennial International Workshop on Plant Resistance to Insects (14–16 April 2014) where they gained information on recent developments on using sustainable methods of controlling insect pests in wheat and other crops. The course was highly rated by all trainees.



SARD-SC wheat trainees participating in the practical field work during wheat improvement training course at ICARDA-Rabat, Morocco

Maize commodity value chain introduces problem solving agronomic options in Ghana

Maize is the most important cereal crop grown by the vast majority of households in Ghana. It is widely consumed throughout the country as the second most important staple food, next to cassava. The World average grain

yield per unit area in 2011 was 5.2 tons ha⁻¹, and 1.9 tons ha⁻¹ for Africa. The average grain yield realized between 2009 and 2011 in Ghana was 1.7 tons/ha/year or 32% of the World average. Some authors have suggested that the

low productivity of maize in Ghana is caused by low adoption of productivity-enhancing technologies, including improved varieties and management practices, and low use of purchased inputs, especially fertilizers.

Problem diagnosis with farmers

Participatory approaches provide opportunity to diagnose and address agricultural development problem more holistically and generate solutions. In view of the low productivity of maize in Ghana, the SARD-SC maize project adopts the Participatory Research and Extension Approach (PREA) on innovation platform for fostering interaction among stakeholders, problem diagnosis and accelerating adoption of technologies. The first step in the PREA cycle is problem diagnosis through community analysis, which enables the identification of farmer production constraints, exploration of opportunities and identification of solutions towards improving maize productivity. Community analysis was conducted in 18 communities in Ghana

across three innovation platforms that constitute the project area in April 2014. Two days training workshop followed by three days of field work and one day presentation of field reports was employed. The major objectives of the analysis were to:

- Share knowledge and information about the livelihood situation in the communities in relation to maize value chain;
- Identify priority problems and opportunities for improving maize value chain in the communities,
- Assess with the community members the existing technology options;
- identify entry points within the innovation platforms for project

implementation in the respective communities;

- Identify community based organizations and partners at community level for project implementation.

Gender disaggregated field data were collected by brainstorming with 745 (423 males and 322 females) farmers mobilized across the 18 communities. Six participatory tools including livelihood means; crop and livestock prioritization; problem prioritization and farmer coping strategies; community resource mapping, soil fertility matrix and seasonal calendar; community institutions, linkages and strength; and input and output market channels and network were used.

Salient constraints identified



Community Analysis in session in Ashanti IP

A total of 29 farmer constraints and vulnerabilities were identified across the three platforms. These comprised 12 crop production, five crop processing, four crop marketing, and three livestock problems and five vulnerabilities (Table 1). The major problems that cut across the three platforms in order of importance were declining/low soil fertility, erratic rainfall/drought, high cost of land preparation/inadequate tractor services, and attack by pests and diseases. Lack of shelling machines/high cost of shelling was the major crop processing constraint reported. Low/ unfair produce prices and lack of standard unit of measurement for maize produce were the major marketing problems identified across the platforms.

Project interventions for farmers

Community action plans were developed to provide solutions to some of the problems identified. The action plan was categorised into 3 including those that will be addressed through:

- Technology validation and agronomic interventions;
- Farmer group training and capacity building;
- Advocacy and linkage to policy, institutions and markets
- Agronomic interventions deployed to validate and disseminate improved options include:
- Strategic mother trials to validate improved agronomic options that address declining soil fertility, erratic rainfall and Striga infestation in the project area;
- Demonstration of mini-kit seed drops to disseminate multiple stress tolerant/resistant maize varieties for quick adoption;
- On-farm demonstration of improved maize varieties and complementary agronomic practices;
- Community seeds production schemes to amplify improved seed availability at the community level.

Agronomic options validated in strategic mother trials in farmers' environment

Strategic mother trials were conducted to validate complementary agronomic options in the farmers environment, being in tandem with the concept of mother-baby trial. Strategic mother trial is a basket of technology options that provide the opportunity to select superior options for nomination to on-farm demonstrations. The conduct of the trials in farmers environment away

from the research stations of research institutes enables the generation of technologies that are consistent with the farmers environment and socio-economic circumstances and hence enables easy adoption. Farmers are also involved in the process of technology generation and validation as they participate during mid-season evaluation to define their criteria for

acceptance of the technology options. Four mother trials were conceptualised and established during the 2014 major rainy season in Ghana: Maize variety x sowing date, maize variety x nitrogen rate, maize variety x legume intercrop, and integrating host plant resistance, soybean rotation and nitrogen fertilizer for Striga control in maize.

Maize variety:

Complementary agronomic options of nitrogen rate, sowing date and legume intercropping are being developed for three maize varieties of different maturity periods recently released in Ghana. The three varieties commonly known with their local release names in Ghana include *Abontem*, *Omankwa* and *Obatampa*.

- *Abontem* (TZEE-Y Pop STR QPM C0) – released in 2010, extra-early maturing yellow (75 to 80 days), quality protein maize and Striga tolerant, yield potential is 4.7 t/ha
- *Omankwa* (TZE-W POP DT STR QPM C4)– released in 2010, early maturity (90 days) white, quality protein maize, drought and Striga tolerant, yield potential is 5 t/ha.



Omankwa (TZE-W STR DT QPM)



Abontem(TZEE-Y STR QPM)



Obatampa (8363 SR)

- *Obatampa* (8363 SR) – released in 1992, intermediate maturity (105 days) white, quality protein maize, tolerant to blight, rust, streak, stem borer, lodging resistant and yield potential is 4.6 t/ha.

These varieties were selected and tested across Guinea savanna, Transition and Forest Innovation platforms, to

address the problem of drought and erratic rainfall which is the major production constraint identified across the 3 platforms during the community analysis. Pictures above present cobs of the three maize varieties harvested late August 2014 from the mother trials established in Forest IP in Ghana during the major rainy season.

Maize variety nitrogen rate:



0 kg N/ha ,*Omankwa*, 8 WAS



120 kg N/ha *Omankwa*, 8 WAS



90 kg N/ha *Abontem*, 8 WAS



90 kg N/ha *Obatampa*, 8 WAS

The problem of declining and low soil fertility was reported across the 3 platforms. The current fertilizer recommendation for maize production in Ghana is 60 kg N/ha, 30 kg P₂O₅/ha and 30 kg K₂O/ha. This recommendation was made in the 1970s and a lot of nutrient depletion must have occurred over the years especially with increase in continuous cultivation and reduction in fallow period that is common in all parts of Africa. Five nitrogen rates (0, 30, 60, 90 and 120 kg N/ha) were conceptualized and tested along with the 3 maize varieties across the 3 platforms. Preliminary results showed that nitrogen fertilization is critical across the 3 platforms. The pictures shown on the left were taken on 5th July 2014 from the mother trial established in the Forest platform, whose soils are considered more fertile than Transition or Guinea savanna.

Maize variety legume intercrop:



Omankwa + Soybean, 8 WAS



Omankwa + groundnut,

Three legumes (soybean, cowpea and groundnut) grown in Ghana were intercropped with the 3 maize varieties for system integration and species diversity. The practice is targeting improving the declining soil fertility, reducing risks associated with climate change, improving food and nutrition security and enhancing system sustainability generally. Existing protocols recommended for sole sole maize and legume production were adopted. All the three maize varieties performed well in association with each of the three legumes that were simultaneously planted in alternate rows across the 3 platforms.

Maize variety sowing date:

Five sowing dates in the Forest and four sowing dates each in Transition and Guinea savanna were tested for the 3 maize varieties. The sowing was staggered at weekly intervals starting from middle of May in Forest platform, end of May in Transition, and Middle of June in Guinea savanna. According to the results of the community analysis, farmers start sowing maize in March/April in Forest zone during the major season, May/June in the Transition and May to July in the Guinea savanna platform depending on rain establishment.



13th May sowing date, Omankwa



10th June sowing date, Omankwa

Integrated *striga* control:

This trial is sited in Guinea savanna where *Striga* infestation was reported as major constraint along with low soil fertility. The treatments comprise 3 *Striga* resistant maize varieties (IWD C2 SYN F2, TZL Comp 1 STR

SYN 1 W, and DT STR W SYN 2) and one *Striga* susceptible Local variety which will be grown in one and two year rotation with soybean. Nitrogen will be added to half of the maize plot during each year of rotation. The

aim is to demonstrate to farmers the available options for *Striga* control which also assist in ameliorating the low soil fertility status common in the region.

Regional variety trials

Development, promotion and or dissemination of improved technologies by Research has been the major way through which research findings are passed on to the farmer and other end users. The regional trials of improved maize varieties and agronomic options were conducted in the 3 Innovation Platforms (IP) to achieve the following goals:

- identify and select superior stable yielding stress tolerant maize genotypes for further testing;
- release superior stress tolerant varieties

to farmers within a very short time for cultivation;

- increase maize yield and productivity, thereby enhancing people's livelihoods, food security and economic development in Ghana;
- determine the best soil fertility management, plant density and tillage practice that enhance the soil's agronomic properties and subsequently maize yield.

In pursuance of the above objectives, eight sets of trials per Innovation Platform

(IP) comprising Low Nitrogen stress, Aflatoxin, and Drought Tolerant (DT) QPM Hybrid have been distributed to the IPs. Fertilizer requirements for the trials were included in the packages delivered. Planting could not be done during the major season due to delay in logistics and rainfall establishment. The minor season has set in and planting is in progress across all IPs. Four sets of the trials with two complimentary crop management options have been planted so far in the Mion District of Guinea Savanna.

On-farm demonstrations

On-farm testing of promising varieties is an essential stage in the development and eventual release of suitable varieties to farmers in Ghana. The main objective is to provide farmers with the opportunity to evaluate, select and adopt the newly released maize varieties, which are appropriate to their needs in order to increase maize yields.

The specific objectives are to:

- provide information to support the maize breeding program on the suitability of the varieties being tested for eventual release to farmers;
- demonstrate and promote the application of modern technologies for the production of promising multiple stress tolerant maize varieties;

- familiarize farmers with available multiple stress tolerant maize varieties with high and stable grain yields in order to facilitate the adoption of the varieties;
- involve farmers in the evaluation and understand their selection criteria for adoption of multiple stress tolerant maize varieties