CORAF/WECARD

Annual Report 2013

Transforming Regional Research and Strengthening Capacity for Innovation in Agriculture for Development

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Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles

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Table of Contents

Message from CORAF/WECARD Management

We are pleased to submit the CORAF/WECARD Annual Report for 2013. Throughout the year, CORAF/WECARD worked assiduously with its regional and international partners towards the delivery of the four (4) result areas of its just concluded 1st five-year operational plan 2008-2013, and setting the stage for a 2nd five-year Operational Plan 2014-2018. The four (4) results were:

1. ***Appropriate technologies and innovations developed;***
2. ***Strategic decision-making options for policy, institutions and markets developed;***
3. ***Sub-regional agricultural research system strengthened and coordinated;***
4. ***Demand for agricultural knowledge from target clients facilitated and met.***

In order to achieve these results, the implementation of the following Programs continued in 2013: *a) Livestock, Fisheries and Aquaculture; b) Staple Crops; c) Non-Staple Crops; d) Natural Resources Management, e) Biotechnology and Biosafety;* f) *Policy, Trade, Markets; g) Capacity Strengthening (and coordination); h) Knowledge Management; i) West Africa Agricultural Productivity Program (WAAPP); j) West Africa Seed Program, and k) Gender.*

These various programs and their accompanying projects contributed more or less to each of the four result areas of the 2008-2013 Operational plan. The total of about 53 projects being implemented in 2013 addressed a range of issues, from technological, institutional and organizational issues on productivity, post-harvests, policy and markets, capacity strengthening to knowledge management across West and Central Africa.

The establishment and the functioning of 171 impact infrastructure (i.e. innovation platforms) by a total of 53 regional projects being implemented between 2008 and 2013 is transforming technology uptake and catalyzing enterprise creation in the region. The adoption and appropriation of these innovation platforms in many regional and national projects constituted some significant indication of the readiness of production systems to link-up to new innovations and markets. It is important to emphasize that there have been tremendous successes in the regional technology generation and use processes. Suffice it to state that although food security challenges still remain in the region, the absence of the innovations currently being deployed would have terribly worsened food security in the region. Therefore we applaud the continuing strides and the significant role of all internal and external partners of CORAF/WECARD for their support to the regional agriculture for development process.

The present report underscores some significant and steady progress being made by CORAF/WECARD in delivering outputs and outcomes from its programs, and in advocacy and coordination of regional agriculture research for development in 2013. This progress is transforming the region's agriculture with the invaluable support from national partners, development partners and technical partners. This is also an opportunity for CORAF/WECARD to express deep appreciation to its entire staff for their continued commitment over the past years, and particularly in 2013.

Thank you.

Dr Ibet Outhman Issa
Chair, Governing Board

Dr Harold Roy-Macauley
Executive Director

Abbreviations & acronyms

AATF	African Agriculture Technology Foundation
ACIAR	Australian Centre for International Agricultural Research
ACMV	African Cassava Mosaic Virus
AFAAS	African Forum for Agricultural Advisory Services
AFSTA	African Seed Trade Association
AGRA	Alliance for a Green Revolution in Africa
APESS	Association pour la Promotion de l'Elevage au Sahel et en Savane
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AU	African Union
AusAID	Australian Agency for International Development
CAADP	Comprehensive Africa Agricultural Development Program
CEMAC	Communaute Economique et Monetaire de l'Afrique Centrale
CIDA	Canadian International Development Agency
CILSS	Comité Inter-Etate pour la Lutte contre la Sécheresse au Sahel
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CORAF/WECARD	Conseil Ouest et CentreAfricain pour la Recherche et le Développement Agricoles/West and Central African Council for Agricultural Research for Development
CSIRO	Commonwealth Scientific and Industrial Research Organisation, Australia
CTA	Technical Centre for Agricultural and Rural Cooperation
DFID	Department for International Development (UK)
DONATA	Dissemination of New Agricultural Technologies in Africa
EC	European Commission
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
FAAP	Framework for Agricultural Research in Africa
FARA	Forum for Agricultural Research in Africa
IAR4D	Integrated Agricultural Research for Development
ICRAF	International Center for Research in Agro-Forestry
ICRISAT	International Crops research Institute for Semi-Arid Tropics
IER	Institut d'Economie Rurale, Mali
IFDC	International Fertilizer Development Center
IITA	International Institute for Tropical Agriculture
ILRI	International Livestock Research Institute
INERA	l'institut de l'environnement et de recherches agricoles, Burkina Faso
INRAB	Institut National des Recherches Agricoles du Bénin
INRAN	Institut national de la recherche agronomique du Niger
INSAH	Institut du Sahel
IRAD	l'Institut de Recherche Agricole pour le Développement
IRD	L'Institut de recherche pour le développement
IRSAT	Institut de Recherche en Sciences Appliquées et Technologies
ISRA	Institut Sénégalais de Recherches Agricoles
ITRAD	Institut Tchadien de Recherche Agronomique pour le Developpement
KKM PLS	Kano-Katsina-Maradi Pilot Learning Site
MDTF	Multi-Donor Trust Fund
MTOP	Medium-Term Operational Plan
NAIP	National Agricultural Investment Plan
NARS	National Agricultural Research System
NASTA	National Seed Trade Associations
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NPCA	NEPAD Planning and Coordinating Agency
RAILS	Regional Agricultural Information and Learning Systems
REC	Regional Economic Community
ROPPA	Réseau des organizations paysannes et de producteurs de l'Afrique de l'Ouest
SCARDA	Strengthening Capacity for Agricultural Research and Development in Africa
SRO	Sub-regional Research Organization
SSA CP	Sub-Saharan Africa Challenge Program
UEMOA	Union économique et monétaire ouest-africaine
USAID	United States Agency for International Development
WAAPP	West Africa Agricultural Productivity Program
WB	World Bank

Developing and using appropriate technologies and innovations

The effectiveness and efficiency of agricultural technologies is key to pro-poor economic growth and wellbeing of West and Central African smallholder farmers and other actors of the agricultural value chain. Therefore the CORAF/WECARD agricultural technology generation and innovation processes are designed to give requisite leverage and productivity push to smallholders' income, lighten the drudgery of labor, work towards affordable food prices, guarantee environmental sustainability, and ensure appropriate anchorage in the rural economy.

The CORAF/WECARD technology generation and use system continued to demonstrate approximate incentives for producers to adopt the technologies via the 171 innovation platforms established by the various regional projects. These encourage users of technology to make investments in labor and cash having been assured of appropriate returns on investments. Therefore, the important linkage of technology generation to both input and output markets remain a significant sine qua non supporting factor.

Technologies & Innovations from Livestock, Fisheries & Aquaculture Program

The CORAF/WECARD Livestock and Fisheries Program strive to ensure that the livestock sub-sector sustainably delivers on its role as a major driver of the many rural economies of the region. This is especially because of their very significant roles in food and nutritional security through the provision of meat, dairy and fish products; in manure; in draught power on farm; hides, skin, and fiber.

The involvement of women and youths in the livestock and fisheries sectors in the region remains very high. The **Gender mainstreaming unit** of CORAF/WECARD remained engaged in all aspects of projects being implemented in the Livestock and Fisheries Program, and in the Innovation Platforms. This is aimed at bringing more science to bear on the implication of gender balance in generation and use of knowledge-based outputs for growth and rural economy development.

Technical and economic performances of low cost irrigation systems established. CORAF/WECARD's regional project on 'Building livelihoods resilience to alleviate poverty in semi-arid areas of West Africa' is mobilizing actors of the value chain and demonstrating in smallholder farms the crop yield and economic potentials of veiled drip irrigation as highly efficient in vegetable farms water use. Producers in project sites in Togo, Mali and Niger are currently up-taking these innovations through this project.

Traditional irrigation system

Drip irrigation with veil

Conventional drip irrigation ;

Californian irrigation system

CORAF/WECARD is emphasizing the important role of gender in the fisheries value chain

Wetland areas mapped: Integrated aquaculture systems hold the key to enhancing sustainable production in fish farming. Within this ideal, the regional project on 'sustainable integrated pond based aquaculture with rice and poultry production: Economic, social and environmental assessment' mapped important wetland areas in which integrated fish farming could be optimized. In 2013, the project also produced sunshine hours, rainfall and soil types maps in sites in North Central and South Western Nigeria. These maps were distributed to producers, and a similar mapping was launched in Cameroon and Sierra Leone in 2013. A baseline information on the socio-economic status of the wetland fish farmers was equally produced in the three countries (see Box 1 for some information in the case of Nigeria). Given the growing need to intensify integrated fish-farming systems, a new project on integrated aquaculture com rice and piggery production was launched in 2013 also in Cameroon, Nigeria and Sierra Leone.

Box 1: Highlights on Socio-economic Status in Wetland Fish Farming in Nigeria

This project on integrated aquaculture was launched in 2010. In 2013 a study, involving the fish farmers, partners in this project, was conducted in the North Central and South Western zones of Nigeria to assess effect of uptake of new approaches being introduced by the project. Traditionally, fish production is done using earthen fish pond mainly for the production of *Clarias* species (catfish), their fish of choice in fish culture. With the integrated production it was recorded that some of the fish farmers (52.9%) reported annual fish yield of 10,000 kg; about 42.4% of the farmers made some profit of more than US$ 2,000 annually. The fish-smoking was the main post-harvest processing used; and about 20.3% of the farmers were involved in post-harvest processing. Sales at farm gate (51.1%), through middle-persons and whole sales, constituted the farmers main form of disposing the cultured fish. The project continued to create awareness on the usefulness and profitability of the integrated approach.

Wetland ponds containing both fish and rice in a project site near University of Ibadan, Nigeria

New region-wide projects launched in 2013: Two new projects geared towards intensification of household fish farming (titled: '*Ecological intensification of extensive household fish farming systems in West and Central Africa*), and the second on the productivity of dairy cattle (titled '*sustainable improvement of productivity and competitiveness of bovine dairy value chains in West and Central Africa - AMPROLAIT project'*) were launched during the year. The project on household fish farming is identifying and facilitating the transfer of innovations that could assist smallholder family fish farming in Cameroon, Côte d□Ivoire and Benin. Similarly, the AMPROLAIT project is identifying and transferring innovations aimed at improving smallholder dairy production in Burkina Faso, Cameroon, Niger, Senegal and Chad. A sample of preliminary field information collected in Senegal is shown in Box 2.

Box 2: AMPROLAIT project: Highlights on 2013 baseline information in Senegal

- That most of the herders were from Fulani ethnic group (78.9%),
- Mixed crop-livestock farmers were about 76.5%.,
- Most of livestock herders could only read and write in Arabic language.
- Animal genetic resources consisted the following local breeds: Gobra zebu (29,6%) and Djakoré (25,4%); and the herds (average of 39% bovines) were composed of association of Gobra zebu, Ndama cattle, Djakoré, Maure zebu and other cross breeds.
- Farming systems were extensive with milk productivity at 0.98 liters/cow/day during dry season and 2.16 liters/cow/day during raining season.
- Price of fresh cow milk varied from 300 to 500FCFA per liter, and the net margin per cow par day was estimated at 575 FCFA.
- Farmers' organizations encountered organizational and structural challenges, especially in the following areas: poor access to fund, little interaction with Government bodies, poor organization of their farming and marketing processes; and lack of capacity to effectively participate in the innovation platforms.
- Data base of locally available feed resources, including concentrates made from cotton seed cake, peanut seed cake, cereals' bran, etc.; and fodder, mainly crop residues, fruits, grass straw, etc.
- Physico-chemical analyses indicated that characteristics of locally produced dairy varied with season.

The catfish – Benin and Nigeria's commonly smallholder farmed fish

In 2013 the Livestock and Fisheries Program facilitated and coordinated a regional drive leading to innovative adaption of three existing technologies for enhanced productivity of the farmers' production system. The innovations include artificial insemination (AI) on natural estrus aimed at reducing the intervals between calving; adapted new techniques for milk quality preservation along the value chain – involving the new milking techniques which embed increased hygiene, preserving calf survival and the maintenance of permanent reproduction of the cow.

Baseline data on ticks and tick-borne diseases developed within the framework of the regional WECATIC project. A comprehensive understanding of the type and seasonal variation in abundance of cattle ticks remains a most formidable tool in the control of both the pests and the diseases the ticks transmit. The Livestock and Fisheries Program in 2013 therefore facilitated and coordinated a regional baseline information development based on seasonal sampling of the parasites, and the various diseases they cause on cattle in Cameroun, Benin and Burkina Faso. The *Boophilus* genus was identified as the most commonly distributed tick, and was also identified as the most important vector transmitting *Babesia bovis*. The severity of the disease was been found to vary from one location to another. *Babesia bovis* is a single-celled protozoan parasite of cattle which occasionally could infect humans who might come in close contact with the animals, hence for a durable control.

Close-up on a tick-infested cattle

Resistance of ticks to acaricides (pesticides) constitutes a major challenge in the region's livestock industry. Studies in which a combination of chemical acaricides (with the active ingredients: deltamethrin, amitraz, cypermethrin and chlorpyriphos) and aqueous extracts from some known medicinal plants (*Cassia nigricans, Metracarpus villosus, Hyptis suavelens, Thevetia nereifolia*) have indicated a reduction of *Boophilus microplus* infestation. This could reduce the financial burden on the farmers who have to conduct repeated treatments with chemical pesticides in a year.

Enhanced productivity in integrated rice-fish systems: In 2013, the Livestock and Fisheries Program conducted some analyses on the productivity of one of the integrated systems the Program is proposing to farmers. It was demonstrated that rice grains yield were extrapolated to be 3.3t/ha in rice-fish integrated systems as compared with values of 2.3t/ha in a usual farmer conventional rice production system. Water use efficiency was 17 times higher under integrated system of rice production than conventional systems, especially in the Sahel of West and Central Africa. This has implications for production systems in water limited environments, and emphasizes the benefits of integrated fish farming. Additional benefits also include the ability of such integrated systems in assisting the farmers in spreading production risks that may be associated with the environment.

Technologies & Innovations from Staple Crops Program

The West and Central Africa's staples provide the population with the critical energy and nutrients they need. In West and Central Africa, rice, cassava, corn, millet, sorghum, yam, cowpea and a number of other crops provide the food supplies of the region. Therefore these essential crops are required to be regularly available and affordable to avoid widespread hunger in the region. The Staple Crops Program strives to reverse the very low productivity (averaging 20% of yield potential) of the region's top staples. Current crop yields stand as follows: rainfed rice, 1.49 ton/ha and irrigated rice, 3.5 t/ha as against potential yield of 5-8 tons/ha; maize yields stand at 1.24 t/ha against 5-7 tons/ha; sorghum stands at 840 kg/ha against 3.5 t/ha; millet, at 720 kg/ha against 3.0 tons/ha; cowpea at 530 kg/ha against 2.5 tons/ha and groundnuts, 830 kg/ha against 3.0 tons/ha; cassava 9 tons/ha as against 50-70 tons/ha; yam, 10 t/ha as against 40-50 tons/ha; plantain, 8 tons/ha against 38 tons/ha.

All projects implemented under the Staple Crops Program in 2013 integrated innovation platform (IP) principles, environmental safeguards, and mainstreamed gender.

Staple crops gender main-streaming 2013:

Beneficiaries from the regional cowpea project – 41% were below the age of 30; 27% in Mali, 50% in Benin, 33% in Burkina Faso and 53% in Sierra Leone.

68% of participants at the Program's regional exhibitions on maize and cowpea storage and processing in Cameroon and Niger were women

500 women benefited from the regional fortified sorghum flour technique in held in Niamey, Niger, and have been contracted by SOS villages.

66 women, from Cameroon and Nigeria, participated in training on IPM and integrated soil fertility and water management aimed at improving maize productivity

23 women trained in Cameroon (14 in cowpea–wheat flour processing and 9 in laboratory practices

60% and 50% of persons in Burkina's seed system are youth and women respectively.

10 high-yielding maize varieties were proposed to farmers so as reduce the large quantity of land races being used in most rural production of the crop. The new varieties were being promoted to be inter-cropped and rotated with two cowpea varieties and a soybean variety. The new maize varieties are normal maize and QPM which are tolerant to drought and resistant to the witch-weed, *Striga*. These characteristics qualify these varieties to significantly enhance the crop productivity in Burkina Faso, Mali, Nigeria and Senegal.

69 varieties of maize, sorghum, groundnut and cowpea which had been nutritionally enhanced and tolerant to drought and *Striga*, were tested through the Mother-Baby in researcher and farmer managed trials [in Burkina Faso, Cameroon, and Mali]. Preliminary results indicated that yields of improved varieties were significantly superior (> 30%) to the local cultivar under both

fertilizer and non-fertilizer applications.

Regional projects facilitated and coordinated by CORAF/WECARD in 2013 proposed new innovations aimed at enhancing plantain productivity. These included enhanced techniques for the isolation and testing of the virulent strain of the pathogen *Beauveria bassaiana* against *Cosmopolites sordidus* which helps identify this pathogen; high yielding plantain varieties tolerant to diseases and pests through multi-location field trials on varying soil types; and also characterized agro-ecologies, including soil types for plantain production in West and Central Africa.

Women group being trained in Benin to use efficient cassava dough compressor

Reference collection of bananas and plantains at a CORAF/WECARD base center, CARBAP, with more than 700 accessions

A Nigerian women's group trained in seed yam production and distribution

Durable nutritional products such as new maize flour product fortified with cowpea were introduced for infants' weaning purposes. Fortification of maize flour with cowpea provides complimentary and diversified amino acids and essential minerals needed by weaning babies and nursing mothers. This product was code-named yêkê-yêkê in Benin. A similar formula was also adapted in Senegal and Niger, specially targeting the Program's drive to reduce stunting in children in rural communities.

Composite bread developed in Niger with 20% cowpea flour and 80% wheat flour. A wider application of this innovation could significantly reduce the amount of foreign exchange expended in wheat importation.

Product storage technologies: The regional post-harvest project adapted a triple bagging technique innovation, geared towards eliminating insect pest-induced damage to stored grains in Senegal. This technique should eliminate the 20% loss in grain quality and quantity during post-harvest. The program also successfully introduced farmers to adapt aqueous extracts from two plants (*Tephrosia vogelii* and *Tephrosia sp*.) in protecting stored maize and cowpea grains in Guinea.

Improved varieties of maize, sorghum, groundnut and cowpea which had been nutritionally enhanced and tolerant to drought and *Striga* were adopted by actors of the Innovation Platforms. The high yielding nature of the varieties, with or without fertilizer, and or herbicide use, was an attraction to the farmers. Such varieties have the potential of saving the farmers on these inputs, and even on additional irrigation.

Technologies & Innovations from Non-Staple Crops Program

Non-staple crops, often referred to as cash crops, are usually grown for cash or for profit-making, even though all farmers generally seek to earn income from their work. Most of cash crops grown in the region are mostly exported for industrial purposes. Therefore the international market determines the prices for which they are sold. In the West and Central Africa region these crops include cocoa, coffee, sugar cane, oil seeds, cotton, oil palm, high value vegetables, etc. Even some hitherto food crops are fast becoming cash crops. The Non-Staple Crops Program of CORAF/WECARD was launched in 2011, and the following was achieved in 2013:

A region-wide project on 'Enhancing productivity, competitiveness and marketing of traditional African vegetables in West & Central Africa' launched. This project is promoting the use of improved production systems, and the introduction of high quality seeds with high nutrient-dense cultivars; expanding knowledge on post-harvest and processing of leafy African vegetables; and in enhancing awareness of the nutritional benefits of Traditional African (leafy) vegetables TAVs in Mali, Burkina Faso, Ghana and Cameroun. Traditional African leafy vegetables have been very little studied hence their real potentials in livelihoods improvements and poverty reduction are little understood. In 2013 CORAF/WECARD commissioned the AVRDC (The World Vegetable Center) and other regional and international actors to coordinate and backstop studies in this domain.

The region's leafy vegetables constitute important sources of nutrition and revenue

A regional project on an 'Integrated management of *Ralstonia solanacearum* plant pathogenic soil bacteria in a changing climate launched in 2013. This CAADP-aligned project is identifying biologically variant strains of *R. solanacearum* within the study zone with the aim of proposing innovative control methods to enhance the farmers' practices, especially paying attention on how such innovations could be most adaptable to a changing and more variable climate. A bioclimatic model for the management of this pathogen in Senegal, Burkina Faso, Guinea and Mali also expected to be developed in the course of the project.

Up-scaling the role of women in product commercialization of non-staple crops in the cotton belts of West Africa: Within the ambits of the Non-Staple Crops Program, this regional gender mainstreaming project was launched with focus on the quantification of the productivity of rural women in the cotton, sesame and soybeans value chains. This was aimed at proposing innovative women empowerment approaches, hence encouraging them to take-up greater roles especially their involvement in the commercialization of processed cash-crops products in Benin, Burkina Faso, and Togo. The project is also making available improved genetic resources with the goal of enhancing the crops' diversification and yield.

'Promotion of new innovations in integrated management of cotton insect pests in West Africa' was launched in 2013. The project is taking the initial steps in the production of decision-making tools for farmers, industry and policy makers, and is strengthening the capacities of farmers to use new innovations in their production processes in Benin, Burkina Faso, Côte d'Ivoire, Mali, Senegal and Togo.

A regional project on "**Facilitating sustainable intensification of smallholder cocoa farming systems in West and Central Africa**" was launched. The project is contributing to increasing farmers' access to improved cocoa cultivars and farming practices. It is also providing a stimulating framework for

rejuvenating aged cocoa farms with genetically improved varieties of the crop. The project is currently engaging the private sector in selecting and making available improved technologies and innovations in Ghana, Côte d'Ivoire, Cameroun and Togo.

A region-wide study aimed at the reduction of aflatoxin in groundnut was launched in 2013. The project is evaluating the levels of aflatoxin contamination in the crop pre-harvest and post-harvest; and the accompanying market and economic implications of this toxin. The outcome of the study is expected to provide new innovations for pre- and post-harvest handing techniques of the crop.

Technologies & Innovations from Biotechnology & Biosafety Program

The CORAF/WECARD Biotechnology & Biosafety Program was designed as a necessary tool which should contribute to a significant role in the transformation of agricultural economies of the countries of the West and Central Africa. The implications of the Program's mode of action need to be seen beyond the confines of biological innovations, but also in addressing the critical issues related to the region's place in a global economy. A number of achievements were made in 2013, and they include:

Products from advanced biosciences released: Agronomic performance of four (4) Rice Yellow Mottle Virus (RYMV) resistant varieties that were released in 2010/2011 were evaluated and tested in farmers' fields. Wider diffusion of these varieties was also embarked in 2013 in Côte d'Ivoire Ghana, Nigeria and Sierra Leone. In addition to the RYMV resistant rice varieties, two Bt cowpea lines have been released, along with bio-fortified sorghum in Burkina Faso.

Research infrastructure in 13 laboratories in the region strengthened to perform in vitro-in and in-vivo Cassava multiplication; using RYMV1 markers for the mapping and transfer of the RYMV1 resistance trait in local Rice varieties; and studying integrated pest management system of cotton

Fourteen (14) partnerships and alignment mechanisms [10 NARS, 2 CG centers (IITA, for Cassava Tissue Culture and aAfricaRice for marker assisted breeding), AATF for Bt-Cowpea technology, CIRAD for the integrated pest management]: for the development and transfer of these biotechnology innovation platforms were established for delivery of the expected outcomes.

Technologies & Innovations from Natural Resources Management Program

The natural resource base (land, water, vegetation and biodiversity) constitute the main assets and sources of livelihoods for poor households in rural communities of West and Central. Agriculture being a most important and significant channel through which these assets are converted to wealth for the rural dwellers, makes the natural resource base even a most important means for the region's poverty reduction and sustainable development processes. CORAF/WECARD's sustainable NRM approach seeks to optimize the utility of these resources to meet the livelihoods of present and future generations. A total of 13 regional projects on NRM were being implementing by 2013.

Farming systems baseline data developed: A study of 2,400 rural farming households in crop/livestock system in 10 countries of the region provided insight into the status of farming systems with the characteristic socio-economic features of the communities. The study also provided insight into the farming communities' perception of sustainable production systems hence valuable perspectives on plausible scientific interventions to improve farm outputs (see Box 3).

Box 3: Highlights on types of baseline information on households in crop/livestock systems

Little access to modern farming machines (e.g. tractors).

- Crop yield at the rate of 0.4 to 2.0 t/ha.
- Size of household cattle ranged from 11 to 156.
- Availability of cultivable land – most of which were degraded.
- Frequency and level of conflict between crop farmers and ruminant herders.
- Mobility capacity of households (i.e. ownership of modern means of transport - bicycles, motorcycles).
- Level of awareness on climate change effects on agricultural productivity.

Opportunities/challenges in crops/livestock value chain identified: The opportunities included ten (10) value chains around meat and milk (cattle, goat and sheep), cereals (sorghum, maize and millet) legumes (groundnut and cowpea) across projects and countries. Similarly, the main challenges in the meat value included inaccessibility to high quality feed; inaccessibility to improved health facilities for livestock, unavailability of improved livestock breeds – especially for milk production. Challenges in the cereal and legume value chains included inaccessibility of farmers to improved high yielding varieties of the crops, unavailability of improved soil management techniques, frequent drought, inaccessibility to integrated pest management techniques, and inaccessibility to modern farming equipment.

Twenty four (24) Innovation Platforms (IPs) established: These IPs were developed around the following challenges and opportunities of the value chains: sustainable intensification of agro-pastoral production systems; integrated aquaculture with rice and piggery; intensification of land cultivation; building resilience into the production systems; sustainable intensification of integrated crop ruminant production systems; farmers' resilience and adaptive capacity to climate change; integrated soil fertility management; and resilience to climate change of agro-ecological systems along water catchment areas.

Research and policy related gaps in climate change identified: The gaps (see Box 4) constitute the basis for further scientific studies on climate change adaptation. They also present opportunities for engaging policy- and decision-makers on best options for climate change adaptation which benefits the rural-based producers.

Box 4: Gaps in the regional climate science and policy

Agriculture sector

- Limited human, material and financial resources in most national systems charged to manage climate issues. This calls for effective partnerships with institutions within and outside national borders – including advanced laboratories and international centers so as to source the desired low-hanging fruits and longer term solutions to the more variable and changing climate.
- Lack of public policy on mainstreaming climate change and the science of it into agricultural development in the region.
- Marginalization of pastoral farming system in semi-arid areas: There is a need to optimize livestock production on communal land without any conflicts with crop farmers.
- Ecological agriculture indicated to be of high potential in strengthening adaptation. However, studies are needed at different agro-ecological zones ascertain its contribution to adaptation to the more variable and changing climate.

Health sector

- HIV/AIDS: migration may increase the risk of infection with HIV and seasonal changes in food availability can also affect the conversion of a mere viral infection to full blown AIDS.
- Temporal variability of cholera incidence and a significant synchrony in cholera epidemics was observed across countries, consistent with both local variability of rainfall and the global climate variability quantified by the Indian Oscillation Index.

- A result of rainfall decline in relation to malaria transmission in West Africa has been the associated change in malaria prevalence and incidence across the region. Models of early warning system should be useful in response to the increasing epidemic nature of malaria transmission in drier Sahel regions.

Urban sector

- Limited availability of research outputs on the specificities of climate change adaptation in the urban areas of West Africa. A few research information is however available for some coastal cities. There are deficits in knowledge of the key interrelated processes that drive Africa's climate, and how different populations might be affected.
- Inadequate urban infrastructure for the increasing population – resulting in low standards of living, negatively impacting on health, aggravating climate hazards (coastal erosion as a result of population pressure, and flooding).
- Lack of information on climate impacts in the region with large coastline and also hotspot of climate variability and change.

A continent-wide AfricaInteract project launched: A formal agreement between CORAF/WECARD and the Comission des Forets D'Afrique Centrale (COMIFAC) under the auspices of AfricaInteract became functional in 2013 following a series of regional consultations and sensitizations in Western & Central African region (CORAF/WECARD); in Eastern Africa region (ASARECA), and Southern Africa (FANRPAN). This project, led by CORAF/WECARD, is promoting and supporting effective documentation and sharing of climate information; and identifying policy gaps. These geared towards providing support to related action research that promote holistic integration of climate issues into development policies.

Morphological characteristics of 816 cattle Documented: This characterization comprised 516 from Burkina Faso, and 300 in Benin, using 46 parameters per animal (23 qualitative and 23 quantitative parameters). This population was segregated for molecular characterization of cattle in parts of the region with the aim of improving livestock breeds.

Five (05) microsatellites for assessing importance of the male path in the introgression of zebu genes into trypano-tolerant West African cattle populations developed and deployed: The five microsatellites (INRA189, UMN0103, UMN0307, BM861 and BYM1) were tested for male specificity, paternal compatibility and repeatability scoring (see Box 5). The microsatellite set was typed on three different African cattle populations – West African zebu (including the Zebu Peul, Mbororo, Azaouak and Goudali breeds); East African zebu (including the Improved Boran, Danakil and Raya Azebo breeds); and West African taurine (including the Lobi and N'Dama breeds).

Box 5: Genetic variability in zebu the region's cattle population

The identified genetic variability was compared with that observed in 13 Non-Indian Asian zebu, 100 Indian and Brazilian zebu, 141 Iberian cattle, 112 cattle sires from Atlantic Europe countries and 265 samples from Continental Europe cattle sires. The results indicate that: a) the microsatellite set typed has been proved to be useful for the achievement of the objectives of the Introgression project; b) West African zebu and taurine sires show higher genetic diversity than the other populations sampled; and c) the researcher group has a significant amount of information involving related zebu and taurine sire populations worldwide which allow to identify accurately the "native" West African genetic variability on the male path. Therefore, using the laboratory tests, the male mediated introgression of zebu genes into trypanotolerant taurine cattle populations may be assessed as envisaged in the research methodology of the project.

Enhanced availability and use of scientific knowledge on climate change management in agricultural systems and in policy-making: CORAF/WECARD, in partnerships with IFPRI and CCAFS, articulated a compendium of knowledge and produced a book on the climate, its variability and interactions with agriculture. Sophisticated modeling technique and available data were used to project future scenarios which explored the range of climate change consequences for agriculture, food security, and resource management and offered recommendations to national governments and agencies working on regional food security. Mainstreaming the content of this book into the region's universities and research centers is expected to enhance knowledge on climate science and agricultural productivity.

Copies of book on West Africa Agriculture & Climate Change produced in 2013 by CORAF/WECARD

Strengthened ties with international organizations on climate change: Ties were strengthened with the following organizations following rigorous consultations on partnerships for climate adaptation: FAO, European Research Area-Agricultural Research for Development (ERA-ARD), La Fondation française pour la Recherche sur la Biodiversité (FRB), FARA and the African climate Policy Center. The strengths and opportunities from strategic alliances would be harnessed in strategizing and implementing climate change adaptation initiatives in the region.

Insights into feed rations by farmers enhanced: Introduction into livestock feeds from a combination of farm produce residues from groundnut haulms (12.5% crude protein) and cowpea chaff (11% crude protein) following basal diet of cassava peels (5% protein) and maize residue (4%) resulted in highest mean daily gains in small ruminant live weight (35g/day). These rations improved the livestock health, quality of meat and milk, and enhanced income of the producers. Taking these findings to scale is expected to enhance the region's livestock production, and impact positively on the farmers' revenue.

Box 6: Soil moisture and nutrient (nitrate) dynamics in crop-livestock systems

The study on crop-small ruminant production provided the following insights:

- Soil moisture and nitrate assessment revealed that there was insufficient water in the top soil (30 cm) which covers the cowpea rooting zone (20 – 21 cm) from flowering up to harvest, whereas there was enough nitrate for up to 55 days after planting (DAP) for all depths.
- Low soil moisture in the cowpea rooting zone significantly reduced seed yields (941kg/ha) and total fresh biomass (2800kg/ha) compared to the potential of the crop.
- Supplementary irrigation is absolutely needed at critical periods during pod filling
- Breeding deeper rooting cowpea varieties remains an important approach in water limited zones.

Tool for projecting farm yields and farmers derivable benefits developed and deployed: A yield map was developed within the framework of the regional cereal-livestock-tree agroforestry systems project. The map provides a community level analysis of land cover, land use evolution and how a more ecological landscape approach could be supported by spatial analysis and process-based models. This information is being useful in modeling and informing design of future research interventions, especially in projecting crop yields and estimating revenues accruing from farm yields. When taken to scale by national systems, this tool should provide requisite information for national planning.

Status of the region's animal genetic resources established: A region-wide study on the introgression of Sahelian zebu cattle genes into trypano-tolerant *Bos taurus* populations in Burkina Faso, Benin and Mali clearly indicate

that the trypano-tolerant cattle reared by small holders in these countries have significant potentials in providing meat and dairy products for local markets and boosting regional trade. Wider promotion and availability to farmers of these breeds should significantly contribute to enhanced protein intake and improved wellbeing by the population

Cattle grazing on *Prosopis africanus* pods in a crop's field in Sahel

West African long-horned cattle

Developing and deploying strategic decision-making options for policy and markets

CORAF/WECARD interventions on policy and markets strive to facilitate access to markets for smallholder farmers and actors of the value chain for each of the regional priority commodities. It promotes the formulation of agricultural policy options, and proposes decision-making tools for producers and policy-makers thus ensuring enhanced safety, sustainability of production systems and affordability of products. The policy and market program remains a most transversal program within the CORAF/WECARD programs.

Contribution of the Policy and Markets Program

The CORAF/WECARD Policy and Markets Program remains a very critical cross-cutting program of importance to the region. The Program engages with the traditional technical programs on aspects that require policy options formulation as reported in this section of this report. In addition to the support provided to technical programs, it made the following additional contributions in 2013:

A region-wide project on '**Policy advocacy for sustainable use of non-timber forest products (NTFPs) in West & Central Africa'** was launched in 2013. Non-timber forest products serve a critical purpose to rural communities in the region during off-farming seasons. NTFPs serve as alternative means of livelihoods in the provision of fruits, nuts, gums, oil seeds, latex, spices, dyes, berries, mushrooms, foliage, medicinal plants, peat, fuel wood, etc. Several of these products are exported to earn foreign exchange. The project is studying socio-economic constraints and opportunities for communities to access NTFPs; developing a data base on NTFPs, their exploitation techniques and use. The public availability of such information is expected to enhance sustainable exploitation of NTFP for rural communities' socio-economy and environment benefits of forest-based communities in the projects sites in Burkina Faso, Cameroun, RDC, Gabon and Senegal.

This project is equally producing **awareness and advocacy campaigns** materials which promote policies on sustainable use of NTFPs. This requires strong and self-sustaining network of community-based resource management practitioners and advocates composed of community dwellers, farmers, NGOs, public agencies such as departments of forestry, economic development, agriculture, etc. Given the high relevance of gender in NTFP harvesting, processing and marketing, between 25 to 30% of the actors involved in the project implementation were deliberately chosen to be women.

Policy & markets issues from Livestock Fisheries and Aquaculture Program

The policy and market-related results obtained by the Livestock Fisheries and Aquaculture Program in 2013 geared towards the achievement of Result 2 of the Operational Plan 2008-2013 included the following:

Constraints and the requisite links for effective dairy value chain identified within the framework of the project on 'Building livelihoods resilience to alleviate poverty in semi-arid areas of West Africa'. Costs and profit margins analysis were concluded by early 2013.

Within the framework of the WAAPP and MDTF, the Livestock Program launched the following initiatives: Regional consultation on conflicts related to **livestock trans-boundary transhumance** within the ECOWAS region; promoting regional trade in meat and related livestock products; and evaluation of rangelands in West and Central Africa.

Enhanced accessibility of dairy farmers to credit facilities, and to inputs was achieved through the brokering of linkages to value chain actors. This potentially decreased their transaction costs,

and increased dairy cow productivity within the framework of the dairy project. The increase in yield was from 0.47 liters to 2 liters per day per cow. This increase was maintained even during the dry season in about 300 small dairy farms in the region.

Policy & markets issues from Biotechnology and Biosafety Program

In partnership with CILSS and ECOWAS, CORAF/WECARD produced a revised **ECOWAS Biosafety Regulation** in 2013. The Program also produced a regional guide on Biosafety Procedures to aid countries of the region on the development of biosafety protocoles. Similarly, the status of implementation of the **Cartagena Protocol** on Biosafety was evaluated in eight (8) UEMAO countries during the year.

A new multi-stakeholder mechanism was established towards the implementation of the following: two (2) **Confined field trial** applications for the evaluation of Bt-Cowpea lines in Burkina Faso and Mali.

Four (4) **policy options** proposed to decision makers at the regional level, and advocated for their adoption. Specifically these were:

- ECOWAS Regional Biosafety Regulation;
- UEMOA Biosafety Manual of Procedures;
- Organization of regional Centers of Excellences for Biotechnology research;
- Official position of ECOWAS on genetic engineering.

Policy & markets issues from Natural Resources management

The CORAF/WECARD Natural Resources Management Program made the following specific contributions in 2013 towards achieving Result 2 of the Operational Plan 2008-2013.

Climate Change Policy: Highlights of policy recommendations on climate change proposed included:

- Integrate empirical information generated from climate science into agricultural sector policies through better exploitation of existing 'spaces' such as PAR, informal dialogue, early involvement of policy makers and civil servants, and joint stakeholder monitoring and evaluation of adaptation projects.
- Promote gender sensitive policies on climate adaptation; and the urgently address issues related to strengthening adaptive capacity of farmers.
- Quality control and scrutinize any trade-off and synergies between international climate and trade policies in relevance to regional situations as such policies might impede or enhance adaptations. This requires rigorous testing of the scientific implications of these policies through the whole value chain from smallholder producers to consumers to ensure that adaptation practices could provide layers of resilience against climate change.
- Integrate urban agriculture in National Urban Policy to enhance system adaptive capacity and food security of the low income people, especially for the most vulnerable group.
- Increase the visibility and practicability of National Adaptation Programs of Action (NAPA) at sub-national levels – i.e. to city (CAPA) and local communities (LAPA) levels. This brings to the fore the principle of thinking globally and acting more locally.
- Address climate change impacts within the context of urban-rural inter-dependencies. However, due to the differences in vulnerabilities and adaptive capacities of stakeholders and geographic locations, adaptation activities need to be context specific.
- Develop some model relationships between meteorological information with prevalence of certain tropical human diseases. This is expected to aid the preparedness of policy makers and public medical corps for certain climate-related seasonal diseases.

CORAF/WECARD was mandated by ECOWAS to mobilize the sub-region's agricultural research and production systems for the implementation of the West Africa Agricultural Productivity Program (WAAPP) in 2004. The WAAPP (and Biotechnology & Biosafety Program) constitute some most concrete means of implementation of the ECOWAS-CORAF partnership agreement which was entered into in December 2005. The ECOWAS-CORAF strategy on WAAPP was to ensure more sustainable policy support from the governments of countries in the ECOWAS region towards funding the use of knowledge in agricultural production systems. The approach was based on the need for the governments of the ECOWAS region to entirely appropriate the technology-innovation generation and use processes for agricultural development aimed at ensuring inclusive growth at the grass-roots. The other important goal of the WAAPP approach was to bring back to the national policy agenda the '*orphaned*' issue of funding agricultural research for development processes of the countries of the region following decades of neglect. Following the launch of the first phase (WAAPP 1A) which involved Ghana, Mali and Senegal, all the 15 countries of ECOWAS have now formally embraced this innovative policy on the funding of research for development, with the following phases WAAPP 1A, 1B, 1C and 2A. Specifically the WAAPP's goals of ensuring access of smallholders to productivity enhancing technologies for sustainable growth and competitiveness is being met with significant policy support.

The President of Sierra Leone, Dr. Ernest Bai Koroma at a WAAPP meeting in Freetown in 2013

Funding Levels of WAAPP (US$ million)					
Series	**Countries**	**IDA**	**GFRP**	**Japan PHRD**	**Total**
WAAPP-1A	Ghana	15	-	-	15
	Mali	15	-	-	15
	Senegal	15	-	-	15
WAAPP-1B	Burkina Faso	15	6	-	21
	Côte d'Ivoire	30	6	8	44
	Nigeria	45	6	-	51
WAAPP-1C	Benin	16.8	-	-	16.8
	Gambia	7	5	-	12
	Guinea	-	-	9	9
	Liberia	6	-	8	14
	Niger	30	-	-	30
	Sierra Leone	12	-	10	22
	Togo	12	-	-	12
WAAPP-2A	Ghana	60	-	-	60
	Mali	60	-	-	60
	Senegal	60	-	-	60
	Total	398.8		35	456.8

A World Bank supervision mission visiting a WAAPP rice field in Sierra Leone

An information exchange platform developed in partnership with Carnegie Institute within the framework of the EarthAudit agricultural yield project. Useful information for agricultural production is being made available to users mobile phones linked to a World Wide Web application through this platform. Aspects of agro-meteorological information were strengthened in 2013 following productive collaborations with AGRHYMET and University of Ghana. The EarthAudit project launched in 2012 aims at predicting crop yields, and yield variability which could assist policy makers to take early decisions relative to storage and evacuation of agricultural products during bumper harvests; and or to seek extra food supplies in times of poor harvests especially in the reality of the changing and more variable climate.

High-level policy support secured for agricultural research: The support demonstrated by the ***President of Sierra Leone, Dr Ernest Bai Koroma***, during a 2013 WAAPP consultation in Sierra Leone was a landmark policy involvement in the WAAPP process. The President, who personally participated in the consultation with a large delegation of his cabinet ministers, pledged all necessary support to research and WAAPP. Such high level policy engagement constitute invaluable advocacy for support to generation and use of knowledge in agricultural production. CORAF/WECARD and ECOWAS strengthened their joint pursuit towards delivering this advocacy policy in 2013.

A rice and cassava value chain study was launched within the framework of WAAPP 1C aimed at improving the crops value chain in the Mano River Union zone comprising Liberia, Sierra Leone, Guinea and Côte d Ivoire. A similar analysis was equally commissioned for Ghana, Mali and Nigeria.

A south-south partnership developed with Brazil's EMBRAPA, an advanced research institute with similar agro-climatic conditions as the WAAPP region. This partnership was aimed at strengthening the technology and innovation development capacity of the NCoS. EMBRAPA's experience with NCoS was expected to provide lessons to the WAAPP NCoS especially with respect to soil fertility management, integrated pest management, safe biotechnology and other domains in crops, livestock and fisheries production.

Increased seed production & distribution: Evaluation conducted during the 2013 by the WAAPP support mission indicated high levels of production and distribution of improved seeds. Strengthened distribution of the high-yielding seeds produced by the various National Centers of Specialization (NCoS) would significantly change production and productivity of the farming. The Innovation Platforms are central in such a strategy for technology dissemination and use.

Policy & markets issues from West Africa Seed Program

The Seed constitutes the main propagule for plant growth. The seed is the carrier of new technologies needed for a secured food supply. They constitute the cheapest and most important input in crop production, and are key to agricultural progress. One of the ways to increase agricultural productivity without much additional input is by planting improved quality seeds. It is in fact estimated that good quality seeds of improved varieties can contribute to more than 25% increase in yield. Although the importance of organizing the seed sub-sector has been recognized since the 1920s, this sub-sector still remains in an embryonic state in West Africa. This gap catalyzed the launching of this regional program. The seed sub-sector in West Africa has been plagued with complex challenges some of which border on forging common platforms that create complementarities aimed at leveraging strong partnerships and resources. The West Africa Seed Program (WASP) probably has the largest group of partners amongst the CORAF/WECARD-led programs. The partners span from CGIAR (IITA, ICRISAT and AfricaRice); NARS including universities; national seed services; NGOs; Farmer Based Organization (ROPPA); private seed organizations (ANASEB, UNPSB, SEEDPAG, ASSEMA, APPSN, SEEDAN, UNIS); regional seed initiatives, (including AGRA; the AusAID Seed System Project), Regional Economic Communities (ECOWAS and UEMAO); Inter-Governmental Organizations (CILSS); International Organizations such as the FAO and Syngenta Foundation; the Private Sector (AFSTA), etc. The West Africa Agricultural Productivity Program (WAAPP) is implementing the WASP within the framework of an Alliance for Seed Industry in West Africa (ASIWA) expected to involve all partners working in the seed sector to forge a common vision in ensuring sustainable production and use of quality seeds of the major staple crops in the West Africa sub-region.

The West Africa Seed Program (WASP) was formally launched in 2013, and immediately followed-up with the identified of much needed critical **mass of breeder seed experts**. **Breeders for target crops in the region networked** to execute breeder seed production in select countries.

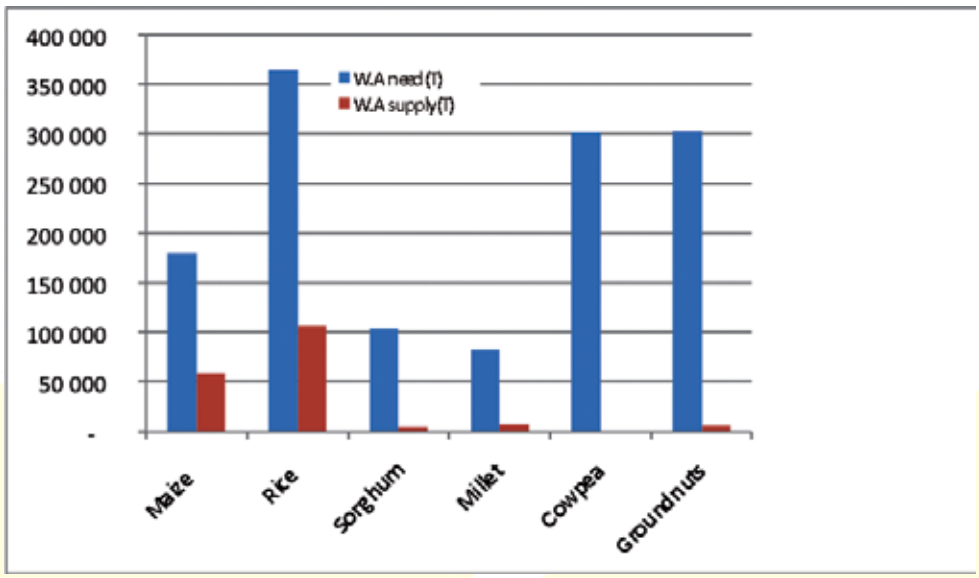
Human resources needed to support the training of key players in the **breeder seed production chain** was identified in 2013.

Contractual agreements with the three CGIARs (IITA, ICRISAT and AfricaRice) and NARS of Ghana, Senegal, Niger signed. This agreement facilitated the needed access to human and plant resources required to effectively implement the WASP.

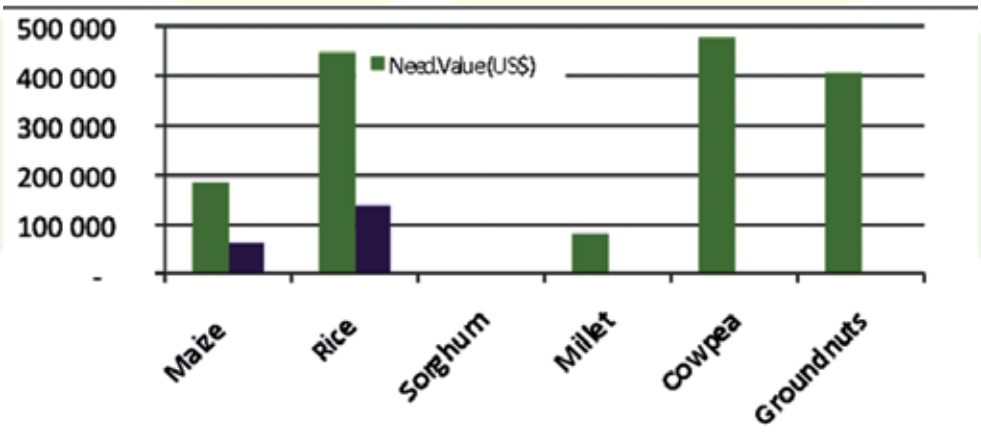
The program implementing NARS were contracted, and over 41 ha of land was cultivated in 2013 for **breeder seed production** (10 ha for maize, 12 ha sorghum and 19 ha rice).

Box 7: Facilitating regional seed regulation mechanisms in 2013

- **ECOWAS Seed Regulation:** CORAF/WECARD formally issued an official release letter to Ministers in charge of Agriculture in the 17 ECOWAS-UEMOA-CILSS Member States, requesting release of official Gazettes of the ECOWAS Seed Regulation so as to allow its **official entry into force as enjoined in Article 88 of the ECOWAS Seed Regulation.**
- **Memorandum of Understanding was signed between CORAF/WECARD and INSAH/CILSS**. This is facilitating the updating of national seed legislations in consonance with the ECOWAS Seed regulation. A coalition of partners involving the CORAF-led WASP, INSAH/CILSS, Seed Science Center at Iowa State University (SSC/ISU) and the Institut Sénégalais de Recherches Agricoles (ISRA) is assisting in this process of updating of national seed regulations.
- **Created synergy between CORAF-led WASP and Syngenta's work in West Africa** – this was aimed at promoting the Annex 10 of the African Intellectual Property Organization (OAPI) Bangui Agreement on plant variety protection, and the International Convention for the protection of New Varieties of Plant. These should encourage private sector investments in the seed industry, and in seed trade in the States of West Africa.



Potential Seed Needs and Actual Supply (Tons) from 13 countries in West Africa



Potential and Actual Seed Value (US$ x 1000) from 13 countries in West Africa

Establish a seed import/export system with a region quarantine pest list in the West Africa region. WASP is enhancing the knowledge and information sharing of national quarantine on pests and pest-induced diseases to facilitate inter-state seed trade. Three (3) of the 15 countries of ECOWAS + Mauritania and Chad have established their national quarantine pest list, and significant progress is being made in increasing this number so as facilitate international seed trade.

Policy & markets issues from Gender Program

According to the United Nations, "……gender mainstreaming is a globally accepted strategy for promoting gender equality….." The CORAF/ WECARD gender mainstreaming is therefore a strategy, to achieve the goal of gender equality. Its focus is to ensure that gender perspectives and attention to the goal of gender (especially with respect to women and youths) equality are central to all activities - policy development, research, technology uptake, advocacy/ dialogue, legislation, resource allocation, and planning, implementation and monitoring of all programs and projects being implemented in the region. In this respect therefore a **revised gender policy document was produced** and adapted to the IAR4D in 2013.

A tool for gender screening within regional projects was also developed This tool enables projects to sound their gender and social balance.

Strengthening and coordinating regional agricultural research system

Capacity Strengthening constitutes a critical cross-cutting core function of CORAF/WECARD. This function strives to enhance research and extension capacity of the NARS to effectively generate and deploy productivity impacting technologies. It aims at ensuring that the necessary skills and critical mass in all major disciplines of relevance to agriculture science, from breeding through systems to policy and markets are available in balanced proportions to ensure that significant dividends accrue to smallholder farmers. CORAF/WECARD's capacity strengthen-ing involves organizational, technological and institutional capacity enhancement. This includes research infrastructure, human resources needed in research, extension and or advisory services, actors in value chains, and food systems. Being an important transversal thematic area, it addresses information and knowledge flows among stakeholders thereby facilitating access to and use of agricultural information and knowledge by stakeholders to increase productivity, production and incomes. It also includes networking and learning through experiential learning and sharing of best institutional practices to enhance performance of the research and development systems.

Human Capital Development (Degree Training) of NARS

Two (2) PhD degrees produced in integrated fish farming

17 NARS scientists enrolled for post-graduates studies in dairy production, livestock-vegetable mixed systems, livestock pests control and in fisheries and aquaculture.

16 research staff from Central Africa Republic, Sierra Leone, Liberia, Niger, Côte d" Ivoire, Guinea, Mauritania, Ghana, DR Congo, and Gambia obtained M.Sc. degrees in various disciplines within the Dissemination of New Agricultural Technologies in Africa (DONATA). This was sponsored under the CORAF/WECARD implemented and FARA-led DONATA project. **Five (5)** other research staff from Liberia, Gambia and Ghana are expected to complete their programs in 2014.

31 NARS hands-on scientists launched (6 B.Sc. 17 M.Sc. 8 PhD) in natural resources management – integrated systems.

Skills Development (Non-Degree Training) of NARS Actors of Value Chain

15 research livestock scientists within the region trained on scientific writing (peer-reviewed article, policy briefs, strategic papers, and communicating success stories)

33 technicians trained in Integrated Pest Management (IPM) and Integrated Soil Fertility and Water Management (ISFWM) in Cameroon, Chad and Nigeria. This was needed in supporting aiding the farmers in adopting the new productivity enhancing technologies required for staples optimal productivity in the project sites.

868 beneficiaries (seed producers, producers, agricultural Extension agents, NGOs staff, agro-processors, and fabricators of plant pesticide extraction equipment) trained in the best practices of IPM, ISFWM, equipment fabrication and processing, facilitated technology diffusion and adoption.

515 actors participating in seed systems project activities and on the Innovation Platforms benefited from various forms of capacity strengthening including seed technology and new information on seed systems.

1325 beneficiaries trained (503 female and 903 males), in planting material production, pest and disease control, soil fertility and water management.

53 beneficiaries were trained on cowpea-wheat flour production technique and commercialization of the flour.

300 individuals (farmers and entrepreneurs) trained in the production and marketing of yam minisett in Ghana, Nigeria, Togo, and Benin.

3,000 beneficiaries benefited from a training exercise which strengthened their capacity in seed yam production and utilization.

Staple crops actors of the innovation platform in Burkina Faso trained on the modalities for accessing credit Enhanced and start-ups in SME agribusinesses some of which were in post-harvest processing.

40 stakeholders from 15 WAAPP- countries were trained on Intellectual Property Rights. This training was aimed at strengthening skills of all on issues of technology transfers and knowledge sharing within and between countries implementing WAAPP. WAAPP centers of specialization (NCoS) are generating technologies and knowledge which are serve as public goods.

Training session on IPR for WAAPP countries in Lomé

24 seed system regulation personnel from Benin and Togo trained in variety release, cataloguing and IT data management.

61 facilitators of the innovation platforms (IPs) were trained to enhance the operations of the IPs.

42 farmers (10 women; 32 men) trained in improved techniques for forage harvesting and storage under the animal feeding strategy within the framework of the project 'integrated cereal-livestock-tree system for the sustainable use of land and improved livelihoods for small scale farmers in the Sahel.

Labor-intensive Forage harvesting in the Sahel

32 enumerators (25 male and 7 female) trained to effectively undertake field data collection on the morphological characterization, trypanosomiasis diagnosis in the field as well as collection and handling of blood samples – a harmonized methodology was developed and adopted by each country team for field sampling. A training manual was produced to aid further training of other grass-root actors.

104 field actors from Ghana, Niger, Nigeria and Burkina Faso trained in seed production, laboratory practices, processing and variety maintenance. Developed and distributed a strategy document on regional training for NARS and selected private sector breeders of maize, rice and sorghum on maintenance breeding.

The capacity of the following regional centers to produce and disseminate research public good for livestock improvement and productivity was strengthened in 2013:

West Africa Livestock Innovation Centre (WALIC ex-ITC): The Center's long-term strategic and operating plan was developed.

Centre international de recherche-développement sur l'élevage en zone sub-humide (CIRDES): The Centers's research aligned to overall regional Operational plan, to CAADP, FAAP and to ECOWAP.

National Centers of Specialization (NCoS) on livestock and fisheries Created: The NCoS on livestock and fisheries in Niger, Nigeria, Cameroon and Sierra Leone aligned to the IAR4D and to CAADP. This were particularly aimed at building and consolidating synergies and complementarities which encourage technology and innovation spill-over. Similarly, CORAF/WECARD facilitated partnerships between NCoS and EMBRAPA on livestock and fisheries. Thus genetic improvement of local livestock is expected following planned exchange of animal genes through GENEPLUS; and specific short trainings on use of the genetic materials through LABEX. Capacity strengthe'ning on improved techniques for production of fodder and tick control also constituted part of the collaborative axes developed between the WAAPP NCoS and the partners.

A manual for the training of farmers and extension workers on integrated fish pond management was produced in 2013.

Burkina Faso, Côte d'Ivoire, Ghana, Mali, Senegal and Togo NARS were backstopped for the production or the review of existing Biosafety laws and bills.

A book on practices and experiences in innovation platform in maize and cassava value chains and food systems through DONATA was published and being distributed in 2013.

The strengthened fiduciary capacity of some CSOs (ATCB-CTRAPA, CNCR) led to contractual arrangements with NARIs and WAAPP coordination units to support procurement processes for the first 6 to 12 months in a process that is expected to capacitate the CSO's business transaction systems

Four (4) brochures facilitated by CORAF/WECARD and produced through IER of Mali, sensitize entrepreneurs and agribusiness actors on the potentials market values of processed pineapples, mangoes, fonio (and sebe) in local and regional markets. This was particularly relevant to WAARI incubates.

Seed policy documents of Togo and Benin anticipatorily reviewed to conform to the ECOWAS regulations

Regional manual on seed business management was developed and distributed. This was aimed at facilitating access of the SMEs to capital. The West Africa seed program (WASP) also recruited business services provider in each target country. The business service provider is facilitating five (5) seed SMEs' effort in each country in developing their business plan, and also in training them in enterprise development.

WASP revitalized National Seed Trade Associations (NSTAs) and the Africa Seed Trade Association (AFSTA), West Africa version (AFSTA/WeCARO). Creating and or strengthening of regional seed trade association is strengthening and promoting a safe regional seed trade especially in the production and delivery of quality foundation and breeder seeds. This inroad which is bringing the private sector to dialogue has been adjudged as a remarkable milestone achievement towards invigorating the dormant national and regional private sector associations in the seed industry. WASP also succeeded in leveraging partnership arrangements between local SMEs and such international companies as Syngenta and with some Indian companies. This is fostering partnerships in the five WASP target countries (Senegal, Mali, Niger, Burkina Faso and Nigeria).

Strategic partnerships developed between CORAF/WECARD and AFSTA aimed at strengthening the organizational capacity of NSTA and of AFSTA-WARO. Capacity strengthening included the contracting of actors along the supply chain; and provision of technical guidance; and in facilitating NSTAs access to best practices. Strengthened capacity of NSTA will enhance their professionalism, hence improving access to loans for their seed businesses; strengthen their capacities in the management of subsidies in the sector; enhance their adherence to local and regional seed legislations.

Two (2) training manuals were developed (one on storage and the other on processing)

WASP project NERICA Rice breeder seed M'Be Cote'D'Ivoire

WASP project maize breeder seed production field at IITA

WASP partners field visit to a maize breeder seed field at ISRA Senegal

WASP project sorghum breeder seed field at ISRA, Senegal,

13 WAAPP implementing countries were supported in establishing their gender programs, action plans and focal points. This was realized in partnership with Young Professionals in Agricultural Research Development

Five (5) female scientist from Senegal, Mali, Burkina Faso, Cote d'Ivoire and Cameroun supported by CORAF/WECARD through a partnership with Agropolis Foundation, in acquisition of mentoring fellowships of the African Women in Agricultural Research Development (AWARD) obtainable in Uganda. In 2013 the awardees were mentored on research and the use of research facilities in international laboratories; pro-actively participated in international peer conferences and short course in research management.

Data base on gender developed for the benefit of actors in the region.

A WAAPP Gender training session, in Lome in August

Dr Pauline Mounjouenpou AWARD recipient being honored

Facilitating and meeting demands for agricultural knowledge

CORAF/WECARD leads West and Central Africa regional agricultural research and innovation in the service of technology development and use with, and for particularly the smallholder farmers. In collaboration with a diversity of partners it generates, and makes available knowledge, technology and innovations that enhance agricultural productivity of the region's farming systems. Such research products are public goods meant to ensure the broadest possible impact from the outputs of its research. Therefore publication of results and freely making available agricultural productivity knowledge for wider dissemination are encouraged.

***171 innovation platforms have been established by the 53** regional projects coordinated by CORAF/WECARD in the 22 countries of the region. Hundreds of actors of in the IPs have been trained to take advantage of available agricultural technologies leading small enterprises creation.*

The IPs being have been created within the framework of CORAF/WECARD's IAR4D in which all actors of the value chain play specific roles. The IPs, have thus, encouraged access to productivity enhancing technologies and ensured effective delivery of outputs to target resource-poor farmers. Enhancing the efficiency and effectiveness of these IPs within the landscape of public sector agricultural science require stronger linkages with well established private sector so as to ensure access to the best technologies, harness efficiencies in product development, and achieve maximum impact through effective delivery and deployment of research outputs. Such partnerships must be managed carefully and innovatively to ensure that the private sector obtain their usual incentives and downstream benefits as well as delivering technologies to stakeholders that promote the alleviation of poverty and hunger.

Knowledge uptake from Livestock, Fisheries & Aquaculture Program

14 Innovation Platforms created on livestock and fisheries: Six (06) were on promoting mixed dairy livestock and vegetable production system are functional; five (05) on improved techniques for intensifying integrated fish farming; and three (03) on improving dairy productivity. The livestock IPs were established in Cameroon, Benin, Côte d'Ivoire, Nigeria, Sierra Leone, Senegal, Burkina Faso, Niger and Chad.

Consolidated awareness creations materials produced to sensitize farmers on tick resistance to common acaracides. This was aimed at reducing the incidence of invasive *B. microplus* and its potential health risks to livestock and humans.

Four (4) success stories elaborated from the regional dairy project, on the following: (i) access to zoo-technical and veterinary inputs through the project Hub in Niger; (ii) white pepper – a commodity with high add value; (iii) improved traditional Wangash cheese for improving revenue generation for; and (iv) livestock innovation platform achievements in Togo;

Five (5) technical papers produced on: (i) low cost irrigation system; (ii) bio-organic fertilization of vegetable cropping soils; (iii) composting technique using animal wastes; (iv) improved production system of white pepper; (iv) improved forage production using *Cajanus cajan;* and, (v) normalized technique for the production of traditional Wangash cheese

Two (02) innovations platforms created on maize in Chad and in Nigeria in which 309 beneficiaries participate. These actors were supplied with improved seeds of new and more productive varieties to facilitate technology adoption.

Three (03) innovation platforms on cowpea established in Benin, in Mali and in Sierra Leone. The IPs are also facilitating learning, experience sharing and technology adoption in the project areas.

Seven (07) innovation platforms on plantain established in the six target countries, two being in Cameroon. Cameroon is a most important hub on plantain production, hence the high number of IPs on plantain in the country. CARBAP continued to play significant role in facilitating the IPs in 2013.

Seven (07) improved plantain varieties packaged with integrated pest management (IPM) and integrated soil fertility & water management (ISFWM) practices were made available for diffusion and adoption.

Six (06) fact sheets on cassava, yam and maize productivity developed from Benin and IITA (Cotonou). This facilitated technology diffusion for adoption

31 radio and TV broadcasts on the PIF technique for the mass production of healthy planting materials was diffused to farmers and entrepreneurs in Benin and Cameroon during the period of 2013. The other themes broadcast via the mass media included integrated pest management (IPM), integrated soil fertility and water management (ISFWM).

Publication on the identification and management Banana Bunch Top Virus (BBTV), Black Sigatoga Disease was published in fact sheets, in conference proceedings, and in peer-reviewed journals.

35 sensitization workshops on the regional seed system were held to sensitize beneficiaries on the new knowledge and technologies emerging on the seed systems.

Four (04) fact sheets on seeds were produced and distributed to beneficiaries in 2013.

Four (4) entry points on the dissemination of agricultural technologies (DONATA) were addressed. These were: i) access to quality planting material and best bet practices including soil fertility; ii) processing and value addition to maize and cassava products; iii) product commercialization and marketing; and iv) policy dialogues.

96 multi-stakeholder innovation platforms (IPs) created for maize and cassava value chains and food systems in 14 countries through DONATA. The improved varieties addressed such production constraints as drought, low soil fertility, pests, diseases, and parasitic weeds. **33,855 actors** of which, 47.4% were females were mobilized in the 96 maize and cassava IPs.

Facilitating technology accessibility:

150 demonstrations on improved high-yielding maize were successfully established, in Cameroon, 36 in Chad and in Nigeria. The high-yielding varieties were expected to turn-around maize production in water limited and drought-prone agro-ecologies.

9,318 kg breeder seed of improved maize produced to facilitate technology adoption injected into local communities' production systems via the DONATA project.

309 beneficiaries were supplied with certified seeds of drought and Striga tolerant varieties of maize, some of which were nutritionally enhanced (QPM).

11 improved cowpea varieties tolerant to moisture stress and to Striga were made available to farmer – thus enhancing access to highly productive new varieties.

Prototypes of the triple layered sacs (PICS) promoted in Mali for cowpea grain storage resulted in reduced infestation of storage pest.

72 ha of land were put under experimental trials and field demonstrations on cassava planting material multiplication.

Maize yields in the IPs varied from 1 to 5 t/ha as against 1.3 t/ha where improved planting materials were not used.

Cassava tuber yields varied from 20 – 35 t/ha over farmer practice were obtained as against 10.6 t/ha where improved materials are not used.

3,038.5 ha cultivated with maize in the IPs in the region under the DONATA maize technology uptake project.

1,131.9 ha cultivated with cassava in the IPs in the region under the DONATA cassava technology uptake project.

4,864 tons of maize breeder seeds produced in Burkina Faso IP on maize under the DONATA technology uptake project. And 1,200 tons of grain maize was **commercialized.**

23 processing entrepreneur units were involved in the processing and agro-food product IP and each facility employees 5 people with 115 direct beneficiary processors.

18 emerging farmer entrepreneurs were involved in seed and grain maize production and commercialization in the maize value chain in Burkina Faso under the DONATA cassava technology uptake project.

Phyto-sanitary and cassava multiplication techniques mainstreamed in regulation production systems in West and Central Africa. Information on these techniques was diffused via Spanish television, Ghanaian media; video clips; and 6 flyers.

Box 8: Story of Azourma from Sissili, Burkina Faso

Azourma was a school dropout and as a famer was struggling to feed his family and even contemplated of moving to Ivory Coast to work in the commercial crops sector. He however became an active maize IP actor in 2008/2009 and acquired improved drought tolerant and high yielding maize varieties as well as enhanced skills in maize value chains from INERA (research) through the IP. He increased his maize yield and now obtains 3.5 – 5.0 t/ha and today, has 28 ha for the production of quality grain maize. He hires labor including women especially during harvesting. He became less dependent on micro-finance institutions in the IP since he used the warrantage (with-holding part of his produce), only to market such grain prices soar. This assured this producer reasonable profitability for purchase inputs for the following year's maize crop. He created small business in his village such as cellular phone charging facility, local restaurant, and keeps over 100 guinea fowls in his maize farm..

Knowledge uptake from Natural Resources Management Program

1000 actors of the NRM were linked to 43 functional innovation platforms (IPs): Each IP included a range of stakeholders. These essential interactions are significantly enabling key issues to be addressed with the collaboration of the key actors and as a result the achievement of success stories in many countries. Examples of such successes included the reduction in mortality of goats and improvement of access to tractor services thereby ensuring timely planting in Ghana under the Small Ruminant on-farm project.

Box 9a: Story of Bande Amadou, a cattle herder at Banfora in Burkina Faso

Bande Amadou, a Fulani cattle herder and member of the platform hitherto milked his cows only for home consumption. With a milk collection centre at his door step thanks to the platform, Amadou said: "I was encouraged by the opportunity of selling some of my milk very close to our home without going to look for distant buyers. The additional income from the sale of milk has become a regular source of income which is helping the family to meet certain daily expenses particularly food".

Box 9b: Story of Barry Amadou, a milk producer in Banfora, Burkina Faso

The family of Barry Amadou with two wives and several children depended on proceeds from the sale of milk to cover parts of the family's daily food needs. Before the establishment of the platform Barry Amadou narrated that he was grappling with the challenge of taking care of the children of both wives for several hours of the day while the wives were away to sell the milk. With a manifested sigh of relief Barry Amadou said: "The platform has effectively linked milk producers with collectors which has resulted in a win-win situation – my wives no longer have to walk long distances to sell the milk and I also don't have to stay all alone with the children for several hours every day".

Knowledge uptake from West Africa Seed Program

The contributions of the WASP to Result 4 of the CORAF/WECARD operational include:

Baseline/reference data created in 2013 to facilitate identification of any changes. The study helped identify priority areas along the seed value chains in the sub-region and the first draft of the study is ready.

ECOWAS seed regulations reproduced and distributed to the 17 ECOWAS/UEMOA/CILSS countries for publication in National Gazettes.

Manual for establishment of the West Africa Seed Committee and the National Seed Committees reproduced and distribution.

Breeder seeds in storage at IITA

Information & Communication contribution to Result 4

The sharing of scientific information and the communication of research outputs constitute some important core function of CORAF/WECARD since the inception of the organization. This core function ensures the visibility of the research potentials in changing agricultural productivity in the region. In 2013 the following were achieved by this cross-cutting program of CORAF/WECARD:

Five (05) new research information distribution lists were created in 2013. This brings to 12 the available distribution lists. The new lists were: wasp@coraf.org; acteurs-ac@coraf.org; dg-ds@coraf.org; coordonnateurs-nat@coraf.org; coordonnateurs-cns@coraf.org

300 new requests for agricultural technology information from actors (producers, researchers and students...,) met.

ICT and data management: Daily updates of the partner portals and the web sites; data bases upgraded with new information on technologies from Togo, Benin, Côte d'Ivoire, Senegal , Niger, Nigeria, Ghana, Mali;

A program on communication capacity strengthening was launched to the benefit of staff in charge of communication within WAAPP and of the NCoS. This was aimed at a more effective the communication of outcomes from WAAPP.

22 NARS participants trained on social media and Web 2.0

Publications

15 success stories published on various technologies developed and disseminated through short film and flyers.

10 brochures, leaflets, and fact sheets published on various documents on projects and programs.

Publication policy of CORAF/WECARD produced;

Annual report 2012 of CORAF/WECARD Published.

Five (05) issues of CORAF ECHO published;

Five (05) issues of *Coraf Action* published;

Increased visibility of CORAF/WECARD

73 articles published in the public media on CORAF/WECARD in West and Central Africa.

Three (03) short films produced on CORAF/WECARD projects results developed and published through YOUTUBE;

Documentary on success stories of CORAF/WECARD produced: "research and innovation, pillars of CORAF/WECARD"

Blog on CORAF/WECARD created

www.coraf.org web site occupied the 100 best positions on Google - number of visitors per month increased from 3500 in November 2012 to 10500 per month in October 2013.

Advocacy for Agricultural Research for Development

The Advocacy for support to agricultural research for development in West and Central is a continuing core function of CORAF/WECARD. Issues addressed by this core function include: a) Establishing of environment for sustainable broad-based agricultural productivity in the region. This includes advocacy for evidence-based policies that benefit smallholders in the agriculture industry (research, producers, SME agro-enterprises, policy-makers and decision-takers, investors, etc.). Within this domain, CORAF/WECARD also pursues the re-organization of institutional reforms which enhance technology generation and its uptake processes for productivity growth in smallholders. b) Resource mobilization for regional research for development. This covers increased and sustained investments by both internal and external investors in the production and distribution of the agricultural knowledge public goods which benefit the smallholders. CORAF/WECARD's roles within this function includes provision of proof to West and Central Africa policy makers to invest and appropriate agricultural research which continues to oil the engine of growth of their economies.

Formal agreement with ECOWAS secured on the coordination and leadership of the West African Seed Committee (COASEM). This agreement also embodied the leadership by CORAF/WECARD of the West Africa Seed Alliance (ASIWA) for a transitional period of 5 years; and leadership in establishment of National Seed Committees in the 15 countries of West Africa. This championship role that ECOWAS assigned to CORAF/WECARD during this period strengthened the legitimacy of CORAF/WECARD as the lead institution advocating for increased use of improved seed varieties for agricultural productivity and income.

Regional consultations identified and proposed logical policy solutions to the challenges in regional and cross-border trade in agricultural products. The identified solutions included harmonized texts on VAT certificates within the ECOWAS and UEMOA; and launch of ECOWAS regional trade policy which adequately removes bottlenecks in regional trade.

Coordinated an endeavor in 2013 in which some policy options were proposed for sustainable management and utilization of the region's forest resources. This endeavor also involved the following: CILSS, UEMOA, ECOWAS, FAO, IUCN, CIFOR and the ECOWAS Member States. The main thrusts of this policy was articulated into a Strategic Action Plan, from a hitherto Convergence Plan, aimed at elevating the status of the forests of West Africa, in line with the strategic vision 2020 adopted by ECOWAS.

Box 10: Main thrusts of the Strategic Action Plan

- Ensure consistency and the importance of the Convergence Plan for West Africa and at international level among other major current strategic issues and their alignment to the principles of Rio + 20
- Render the Plan attractive, realistic and also an engine for the sustainable management of forests and the socio-economic development of the region
- Conduct sectoral analysis which addresses all sections of forest resources, including wildlife through legal and legislative aspects.
- CORAF/WECARD was mandated to render more visible the role of national research institutions in the Convergence Plan and to also take the lead in research operations within the context of the Plan of Convergence, particularly with respect to institutional review and forest research capacity in ECOWAS countries

CORAF/WECARD mobilized and secured the support of CGIAR centers (IITA, ICRAF, ICRISAT, and AFRICA RICE) operating in the region towards the strengthening of the WAAPP National Centers of Specialization (NCoS). The backstopping supplied by the CG is enhancing the effectiveness and efficiency of delivery by the NCoS. Alignment of CGIAR research to the priority areas of the countries and the WAAPP NCoS is expected to transform delivery of agricultural technologies for growth in the region.

Agreement with the World Bank on the 2nd phase of WAAPP for Mali reached and signed in 2013. The trade-off from this agreement was a US$ 4 million being apportioned by Mali to CORAF/WECARD for regional collaboration and facilitation of trans-boundary activities.

New financial partnerships being developed following ongoing consultations with Bill & Melinda Gates Foundation on their involvement in the implementation of the 2nd Operational Plan of CORAF/WECARD. Initial contacts have proved very fruitful, and partnership perspectives are being jointly examined by both CORAF/WECARD and the Gates Foundation.

Consolidated partnerships: CORAF/WECARD has continued to consolidate its relationships with its existing partners. The consolidation efforts with European research institutions has been especially centered on the innovation platforms in value chains, food systems and natural resource management developed under the coordination of CORAF/WECARD and based on the IAR4D approach and innovation systems thinking, the driving forces of these platforms.

CORAF/WECARD continues to broker new partnerships between NARS and international research centers on WAAPP implementation

Newly appointed Executive Director of FARA (middle, and in white) on a familiarization visit to CORAF/WECARD Executive Secretariat

Programs Oversight

The CORAF/WECARD Program ***oversight*** role is the critical management function provided by top management. It is fundamental to proper operation of all the 12 programs being implemented by CORAF/WECARD. It is the job of oversight to assure that proper direction and implementation schedules remain in place for the programs and regional projects being implemented by 2013.

The oversight functions are also harnessed in its support to project-level activities which seek to achieve the goals and objective of CORAF/WECARD. In 2013 Program management identified and managed cross-program and project dependences. Some of these are described in this section.

Projects being implemented by each of CORAF/WECARD Programs in 2013

Program	Projects launched in 2013	Project on course in 2013	Competitive Projects (2008-2013)	Commissioned Projects (2008-2013)	Total N° for the OP (2008-2013)
Livestock, Fisheries & Aquaculture	0	6	4	2	6
Staple Crops	0	5	4	4	8
Non-Staple Crops	9	9	8	1	9
Natural Resources Management	4	12	11	1	12
Biotechnology & Biosafety	0	2	0	9	9
Policy Markets and Trade	1	2	2	0	2
Capacity Strengthening Knowledge Management	3	6	4	5	9
Total	**17**	**42**	**33**	**22**	**55**

System review

Performance of CORAF/WECARD Operational Plan 2008-2013 evaluated. This paved the way for the development of the Operational Plan 2014-2018.

Knowledge Management (KM) Program reviewed. This review was based on the need for an improved management of the increasing number of scientific knowledge being generated from the regional projects, and the need for such knowledge to permeate the productivity programs of the countries of the regional. The new direction of the KM Program is improving lesson-learning approaches of the IPs; strengthening the capitalization on research results with the creation of technology incubation systems with the availability of entrepreneurship information relative to the technologies from the projects; and facilitating the sharing of agricultural information.

Reviewed and re-orientated the monitoring and evaluation system. A Performance Management Plan (PMP) was developed to plan and manage the process of monitoring, evaluating and reporting of projects under the WASP. Similar PMP are expected for all programs.

M&E manual and a computerized system for data collection and housing, as well as reporting under WAAPP were developed.

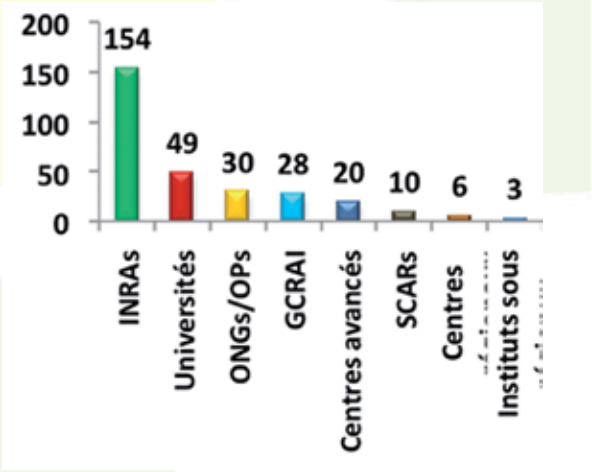
67 NARS M&E officers trained in results-based management strengthened.

Manual for the management of the regional competitive funding scheme reinvigorated to account for the increasing responsibilities of CORAF/WECARD in the administration of the scheme. Some of the new and important inclusions revolve around improved access to R&D funds and enhanced financial reporting modalities.

Three (03) CORAF/WECARD research Base Centers (WALIC, CIRDES, IRED – ex Laboratoire Farcha) evaluated along with the National Center of Specialization on livestock in Niger. The three regional research base centers on livestock are being strengthened so as to appropriately deliver as Centers of Excellence, and also to enable them provide needed assistance to the National Centers of Specialization under the WAAPP initiative. The review identified the potentials, and proposed mechanisms for better harnessing of their potential in livestock productivity. The review also better positioned the Centers for an ISO certification by the World Bank – and this should open-up increased and durable international financing.

CARBAP (Centre Africain de Recherches sur Bananiers et Plantains): CORAF/WECARD supported the development of CARBAP's new strategic and operational plans. This regional research base center of CORAF/WECARD had led development-oriented research in banana and plantain in Central Africa over the years. CORAF/WECARD's role in contributing towards the strengthening of this center is based on the increasing importance of banana and plantain as staples in the region. CORAF/WECARD also played a very proactive role in a forum of scientific, technical and financial partners of CARBAP aimed at ensuring an organized implementation of CARBAP's new strategic and operational plans.

National Centers of Specialization and Base Centers facilitated by CORAF/WECARD



Participation of NARS in the implementation of regional projects

Scientific partnerships enhanced

Forum for Agricultural Research in Africa (FARA): Traditional relationship with FARA continued to be strengthened. In 2013 CORAF/WECARD made significant contribution towards the development of the new Mid-Term Operational Plan (MTOP) 2014-2018. FARA, being the continental umbrella organization, the regional research organizations' MTOPs are dependent on the continental view based on the principles of subsidiarity.

Institut de recherche pour le développement (IRD): CORAF/WECARD continued to revitalize partnerships with its founding partners. The partnership with IRD was one that was vigorously pursued in 2013. Specifically this included support to the IRD-led project Sociétés Rurales, Environnement et Climat (PPR/SREC) . This project which is aimed at improving the adaptation of rural communities to the vagaries of climate change is in synergy with the various climate change projects being led by CORAF/WECARD in the region, e.g. the CORAF/WECARD AfricaInteract. The essence therefore was to share information and knowledge for better services to rural communities.

Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), a founding member institutions of CORAF/WECARD. Recent moves to strengthen the traditional partnership between CORAF/WECARD, and CIRAD aimed ensuring that CIRAD increased the proportion of its investments in agricultural research for development in the West and Central Africa region.

International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT): In 2013 CORAF/WECARD and ICRISAT together examined the potential avenues through which the CGIAR could play more focused role in the WAAPP's Centers of Specialization – the productivity program of CAADP Pillar IV.

West African Center for Crop Improvement (WACCI). CORAF/WECARD commenced the provision technical counsel to WACCI 2013. WACCI assists in developing and sustaining the critical mass required by the various national systems in the development of livelihood changing technologies and innovations through crop breeding. In this new partnership, CORAF/WECARD will be mobilizing participating countries in WAAPP towards the training and production of **30 Ph.Ds on crop improvement and variety creation**.

International Food Policy Research Institutes (IFPRI): CORAF/WECARD in partnership with IFPRI commenced the mobilization of NARS in the use of the IFPRI-developed DREAM soft-ware was facilitated by CORAF/WECARD. Similarly, CORAF/WECARD continued strengthening collaboration on improved techniques for Monitoring & Evaluation – with the use of tools that have the capability to project impact into future. **40 M&E officers trained on impact assessment with the use of DREAM** software

Partnerships with universities in United States: CORAF/WECARD currently engaged some US universities, through a facility offered by USAID, within the framework of "Scaling Agricultural Technologies & Developing Collaborative Partnerships to Prioritize Research for Development" for the benefits of the National Centers of Specialization (NCoS) of WAAPP. This initiative was aimed at creating awareness on the operations of the NCoS and the possibilities of harnessing the potentials available in US universities for enhanced operations of the NCoS.

Commonwealth Scientific and Industrial Research Organisation (CSIRO): CORAF/WECARD's research partnership with CSIRO has been founded the six (6) regional projects on intensification and integrated agropastoral systems, seed systems, and livestock health being implemented in the region.

Strengthened National Agricultural Research Systems

Three (03) farmers' organizations (ROPPA, PROPAC, and APESS) were mobilized towards a more effective participation in IAR4D in the ongoing regional projects. The strengthened capacities of these organizations are assisting them in identifying and defining the new directions for the 2nd Operational Plan 2014-2018 of CORAF/WECARD. The farmers, working with CORAF/WECARD technical staff, identified and delineated 12 priority strategic domains for collaboration, with a consolidate plan of action.

NGOs integrated into CORAF/WECARD activities: The NGOs have continued to play critical roles in the technology uptake system of the region, in complement to the declining visibility of extension systems. Faced with this reality CORAF/WECARD mobilized over thirty national and international NGOs towards a better understanding of the workings of the regional IAR4D process, and their potential roles. Similar to the farmers' organization, the strengthened capacities of these NGOs assisted them in identifying and defining the new directions for the 2nd Operational Plan 2014-2018. These engagements are expected be useful in identifying more formal roles for the NGOs in the agricultural research for development value chain.

Revitalized Extension system: CORAF/WECARD continued to play a significant role in the establishment of the regional network on agricultural advisory services (RESCARR-AOC). Existing literature on the challenges extension and advisory services in the region has been reviewed, and enabling documentation for the operations of the network have been produced and validated by CORAF/WECARD.

Strengthened role of the Private Sector in regional research for development: Following the reduced involvement of the state in provision of a number of facilities needed in agricultural production, and the growing changes in the global environment, the private sector has emerged and are seen playing a number of roles in the sector. These include the acquisition and distribution of inputs (seeds, fertilizers, pesticides, etc), and in post harvests (transportation, storage, processing of produce, etc); the provision of credit facilities, and even in advisory services. The roles of this category of actor are of pivotal importance in the agricultural transformation agenda led by CORAF/WECARD in the region.

CORAF/WECARD facilitated the involvement of the private sector in the IAR4D process in 2013

Financial overview

CORAF/WECARD's financial statements*

1. Balance sheets for the years ended 31 December 2013 and 2012 (FCFA thousands)

Assets	2013	2012
Intangible assets	4 375	15 642
Fixed assets	218 708	245 546
Financial Assets	8 306	2 652
Receivable and similar assets	6 470 316	2 290 538
Cash Assets	3 699 510	4 441 518
Total assets	**10 401 215**	**6 995 896**
Liabilities and net assets		
Capital grant	3 283 053	252 565
Financial liabilities	802 184	419 317
Current liabilities	6 306 633	6 319 526
Cash liabilities	9 345	4 488
Total liabilities and net assets	**10 401 215**	**6 995 896**

2. Statements of revenue and expenses, 2013, 2012 and 2011 (FCFA thousands)

Revenue	2013	2012
Donor grants	5 344 695	5 601 565
Restricted grants	5 344 695	4 269 212
Unrestricted grants		1 332 353
Other grants	257 455	416 665
Interest and miscellaneous		-
Total revenue	**5 602 150**	**6 018 230**
Expenses		
Program related expenses	3 920 772	4 751 824
Management/governance	2 016 730	1 401 146
Total expenses	**5 937 502**	**6 152 970**
(Deficit) surplus	**- 335 352**	**-134 740**

*Figures presented are a synthesis of financial information. Detailed statements are available from CORAF/WECARD on request.

Conclusions

The CORAF/WECARD technology and innovation development and use process are effectively responding and addressing agricultural technology uptake for enhanced productivity of systems.

Regional agricultural research investments continued to marginal areas, and are continually involving a mix of public, private and civil society to support to agricultural technology generation and uptake

Continual alignments of regional projects to CAADP via the innovation platforms are progressively orienting the projects to the direction of entrepreneurship development in rural economies, gender balance and youth in agriculture.

The continual strengthening of the planning, monitoring and evaluation systems is providing significant trade-off on the accountability for research investments.

Some of the remarkable key challenges of the CSO projects include capability to meet the fiduciary requirement. Furthermore, hand-holding and coaching and mentoring is required to enable these CSOs set-up functional IPs and learning platforms based on collaborative learning and collective action.

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Fiche Techniques Produced in 2013

1. Low cost irrigation system – how to install and operate them.
2. Bio-organic fertilization of vegetable cropping soils,
3. Composting technique using animal wastes,
4. Improved production system for white pepper,
5. Improved forage production using *Cajanus cajan*
6. Technique for the production of traditional Wangash cheese

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About CORAF/WECARD

CORAF/WECARD is the Conseil Ouest et Centre africain pour la recherche et le développement agricoles/West and Central African Council for Agricultural Research and Development, the apex regional agricultural research for development coordinating organ.

CORAF/WECARD is the technical arm of the Regional Economic Communities (ECOWAS, ECCAS, UEMOA and CEMAC) for the implementation of the regional agricultural research policy anchored in the CAADP pillar IV. CORAF/WECARD is one of the three SRO's founding organizations of the Forum for Agricultural Research in Africa (FARA).

CORAF/WECARD membership includes the NARS of the following 22 countries of the region: Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Congo Côte d'Ivoire, Chad, Democratic Republic of Congo, Gabon, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, The Gambia, and Togo.

CORAF/WECARD strategic statements

Vision statement: '…. A sustainable reduction in poverty and food insecurity in WCA through an increase in agricultural-led economic growth and sustainable improvement of key aspects of the agricultural research system…'

Mission statement: "…Sustainable improvements to the competitiveness, productivity and markets of the agricultural system in West and Central Africa by meeting the key demands of the sub-regional research system as expressed by target groups…»

Specific objective: 'Broad-based agricultural productivity, competitiveness and markets sustainably improved for targeted groups in West and Central Africa'

CORAF/WECARD Four Result Areas

1. Appropriate technologies and innovations developed
2. Strategic decision-making options for policy, institutions and markets developed
3. Sub-regional agricultural research system strengthened and coordinated
4. Demand for agricultural knowledge from targeted clients facilitated and me

CORAF/WECARD Donors

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