



BIANNUAL REPORT

2015-2016

*Breakthrough in Science and Innovation for Transformation
of Agriculture in West and Central Africa*



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2015 – 2016

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Transformation of Agriculture in West and
Central Africa*

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Abbreviations & Acronyms

AFD	Agence Française de Développement
AfDB	African Development Bank
AGNES	African Group of Experts
AR4&D	Agricultural Research & Development
ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
AusAID	Australian Agency for International Development
AWPB	Annual Work Plan and Budget
B.Sc.	Bachelor of Science
C4R4D	Capacity for Agricultural Research for Development
CAADP	Comprehensive Africa Agriculture Development Program
CCARDESA	Centre for the Coordination of Agricultural Research for Development in Southern Africa
CCAFS	Climate Change Agriculture and Food Security
CEMAC	Communauté Economique et Monétaire de l'Afrique Centrale
CILSS	Comité permanent Inter Etats de lutte contre la Sècheresse dans le Sahel
CORAF	West and Central African Council for Agricultural Research and Development
CRDI / IDRC	Centre de Recherche pour le Développement Internationale
CSIRO	Council for scientific and industrial research organization
DFAT	Department of Foreign Affairs and Trade
ECCAS	Economic Community of Central African States
ECOWAP	ECOWAS Agricultural Policy
ECOWAS	Economic Community of West African States
ED	Executive Director
ENRACCA	Enhancing the Resilience and Adaptive Capacity to Climate Change
ES	Executive Secretariat of CORAF
FAO	United Nations Food and Agriculture Organization
FARA	Forum for African Agricultural Research
GCARD3	Global Conference on Agricultural Research for Development
IARC	International Agricultural Research Centres
IAR4D	Integrated Agricultural Research for Development
ICRA	International Centre for Development Oriented Research in Agricultural
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
INSAH	Institut du Sahel
IP	Innovation Platform
IPM	Integrated Pest Management
ILWAC	Integrated Land and Water Management for Adaption to Climate Change
IRAD	Institut de Recherche Agricole pour le Développement
IsDB	Islamic Development Bank

Abbreviations & Acronyms

ISO	International Organization for Standardization
LFA	Livestock, Fisheries & Aquaculture
M&E	Monitoring and Evaluation
MDTF	Multi-Donor Trust Fund
MITA	Marketplace of Innovations and Technologies in Agriculture
MIS	Management Information System
MoU	Memorandum of Understanding
MSc	Master of Sciences
MWF	Mandela Washington Fellowship
NAIP	National Agricultural Investment Plan
NARS	National Agricultural Research System
NCoS	National Center of Specialization
NEPAD	New Partnership for Africa's Development
NRM	Natural Resources Management
NTFPs	Non-Timber Forest Products
NWFP	Non-Wood Forest Products
OP	Operational Plan
PRAPS	Regional Support Project to Pastoralism in the Sahel
PROPAC	Plateforme Régionale des Organisations Paysannes d'Afrique Centrale
RAIP	Regional Agricultural Investment Plan
RCoE	Regional Center of Excellence
REC	Regional Economic Commission
RESCAR-AOC	Réseau des Services de Conseil Agricole et Rural d'Afrique de l'Ouest et du Centre
RMC	Regional Monitoring Committee
ROPPA	Réseau des organisations Paysannes et de Producteurs de l'Afrique de l'Ouest
S3A	Science Agenda for Agriculture in Africa
S4AC	Science for Agriculture Consortium
SIIP	Sahel Irrigation Initiatives Program
TAAT	Technologies for African Agricultural Transformation
TFP	Technical and financial partners
UCTF	Unité de Coordination Technique et Financière
UNFCCC	United Nation Frameworks Convention on Climate Change
WAEMU	West African Economic and Monetary Union
USAID	United States Agency for International Development
WA	West Africa
WCA	West & Central Africa
WASC/COASem	West Africa Seed Committee / Comité Ouest Africain pour les Semences
WASP	West Africa Seed Program
WAAPP	West African Agricultural Productivity Program

Message from CORAF Management

We are pleased to submit the CORAF Biannual Report 2015-2016, 2 years into the 2nd Operational 2014-2018 designed to finalize the implementation of the Strategic Plan 2007-2016. The 2nd Operational Plan has been adjusted to the continually evolving policy and institutional environment in which CORAF and its stakeholders operate.

This period was marked by changes at the management of the Organization, with the departure of Dr Harold Roy-Macauley from the position of the Executive Director to that of Director General of AfricaRice in March 2015, the return of Dr Paco SEREME as the Interim Executive Director of CORAF from March 2015 to April 2016, and the arrival in May 2016 of Dr Abdou TENKOUANO as the new Executive Director. With many projects coming to an end, changes were also noted with the departure of Dr Aboubakar Njoya, Director of Research and Innovation in July 2016, five out of six Program Managers, and other staff in the Communication and Monitoring and Evaluation Units.

This report has four main sections. The first section (Towards Agricultural Transformation in West and Central Africa: 2015-2016 Milestone) presents key results achieved over the period in review. The second section (Featured Programs - Research and Development) presents detailed results of major programs implemented by CORAF (MDTF, WAAPP, WASP, NEYAT, UEMOA, C4R4D, ECOWAS, AfricaInteract and ILWAC). The third section presents the financial information ; and the last section presents key challenges, conclusion and perspectives of the Institution.

CORAF management is grateful to ECOWAS, UEMOA, EC-CAS and CEMAC, its development partners namely the World Bank, EU, USAID, Global Canada, DFAT, IDRC, The Kingdoms of Spain, Japan and Denmark for their support. The management also appreciates support from the following 23-member countries and their NARS: Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Democratic Republic of Congo, Gabon, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Saô Tome and Principe, Senegal, Sierra Leone and Togo.

The management also wishes to acknowledge the invaluable contributions of all actors involved in the implementation of its regional programs and projects, mostly farmer-based organization (ROPPA, PROPAC, APESS and RBM), the CGIARs

(IITA, AfricaRice, ICRAF, ICRISAT and AVRDC), including the advanced research institutions (CIRAD, IRD and EMBRAPA). This report would not have been possible without these actors who equally receive tremendous back-stopping from the staff of CORAF Executive Secretariat.

We invite you to enjoy this report, and to share with colleagues.



Dr. Alioune FALL
Chairman of the Governing
Board



Dr. Abdou TENKOUANO
Executive Director

About CORAF

The Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricoles / West and Central African Council for Agricultural Research and Development (CORAF) was established in 1987 at the Conference of Heads of African and French Agronomic Research Institutions.

In 1995, it widened its coverage to include English and Portuguese speaking countries of West and Central Africa. Its member institutions of the National Agricultural Research Systems (NARS) are currently in 23 countries including Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Democratic Republic of Congo, Gabon, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Saô Tome and Principe, Senegal, Sierra Leone and Togo.

CORAF intervenes in these countries covering a total land area of 12.3 million km² with a total population of 433.2 million inhabitants out of which 74 % are engaged in agriculture. The average proportion of people living on less than US\$ 1.25 a day in the area of intervention of CORAF is estimated at 48.5 %¹– ranging from 10 per cent in Cameroon and Gabon, to 80 % in Liberia. This figure is however declining in all countries in the region

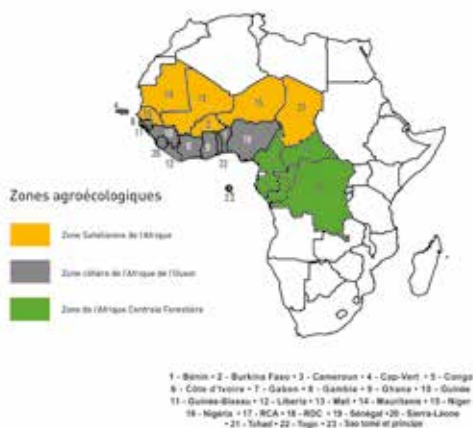
CORAF Vision

«...A sustainable reduction in poverty and food insecurity in West and Central Africa (WCA) through an increase in agricultural-led economic growth and sustainable improvement of key aspects of the agricultural research system...»

CORAF Mission

«...Sustainable improvements to the productivity, competitiveness and markets of the agricultural system in WCA by meeting the key demands of the sub-regional research system as expressed by target groups...»

Our Good Numbers



23 NARS of countries

12,3 millions Km² covered

75 Projects coordinated

7 136 000 USD fundraised

Research Capacity Building



1 206 Trained in MSc and PhD

800 000 Farmers / Users Trained

97 SMES supported

Scaling out improved technologies



335 Innovation platforms created


400 Improved technologies generated

100 Million Farmers using improved technologies



120 Improved seed varieties released

10 000 T of Quality seeds produced

A man in a purple vest and yellow shirt is leaning over a large pile of white bags. The bags are labeled 'NIEBE Tilapia' and 'Tilapia'. He is looking directly at the camera with a serious expression. The background is slightly blurred, showing more bags and a person in the distance.

The Second Operational Plan: A New Pathway Towards Impact Delivery at Scale

The Second Operational Plan : A New Pathway Towards Impact Delivery at Scale

The role of the Second Operational Plan (OP2; 2014-2018) is to demonstrate the added value of CORAF in delivering more on a people-centered approach with focus on generation and use of technology and innovation. It also introduces crosscutting areas such as gender, knowledge management and uptake, capacity development, and partnerships, to add value to programmes.

The OP2 adopts a much better alignment of research themes to the CAADP and RECs agricultural policies and objectives as well as those of the International Agricultural Research Centres (IARC) notably the CGIARs, which are expected to foster effective collaboration and linkages among various programmes in contributing to the delivery of results under a common thematic issue.

These themes are :

- **Theme 1: Food, health and Nutrition Security**
- **Theme 2: Markets and Trade**
- **Theme 3: Sustainable Agriculture**

Within the framework of OP2, interventions are delivered through the following six Programmes, which mutually contribute to the delivery of all five Results: (i) Livestock, Fisheries and Aquaculture; (2) Crops; (3) Natural Resource Management; (4) Biotechnology & Biosafety; (5) Policy, Institutions, Markets & Trade, and (6) Capacity Strengthening & Coordination.

OP2 makes use of key instruments developed during the First Operational Plan (OP1) to facilitate delivery as regards its core functions of coordination and capacity-strengthening and key results, such as the Integrated Agricultural Research for Development (IAR4D) that supports the regional competitive and commissioned projects mechanisms, Innovation Platform approaches (IPs), and the National Centers of Specialization (NCoS) that are to become Regional Centers of Excellence (RCoE).

Under OP2, CORAF is delivering five key results :

- **Result 1: Increased use of appropriate technologies and innovations in WCA**
- **Result 2: Increased uptake of strategic decision-making options for policy, institutions and markets**
- **Result 3: Enhanced institutional and human capacity in agricultural research and development**
- **Result 4: Demand for agricultural knowledge by target clients facilitated and met**
- **Result 5: Result delivery effectively managed by CORAF ES**

These five results areas mutually reinforce each other to achieve the CORAF's Specific Objective and contribute to the General Objective.



**Towards Agricultural
Transformation in West
and Central Africa:
2015-2016 Milestone**

1. Towards Agricultural Transformation in West and Central Africa : 2015-2016 Milestone

During the 2015 – 2016 period, CORAF ensured the coordination of a total of 33 regional projects which recorded stellar achievements by timely responding to the needs of end-users facing thematic challenges of food and nutrition security, climate change and adaptation in all 23 constituents NARS of CORAF in West and Central Africa. Implementation of these projects involved technical research, policy and market issues, capacity strengthening and knowledge management with the inclusion of broad-based stakeholders.

During the OP1, CORAF had received substantial support from developing partners among which were the World Bank, DFID, USAID, DFAT, AfDB and IDRC. ECOWAS and UEMOA contributed through regional projects. Member NARS also contributed with annual fee of US\$ 2,000. Part of the resources were carried over to OP2 and used during the period in review (2015-2016) for the implementation of the programs and projects.

The capacity of CORAF/WECRD has been acknowledged by an independent review committed by the Commission of European Union and they wrote :

«...CORAF's strong governance and management capacity enabled it to attract programs consistent with its core mandate, of non-Trust Fund donors, including the World Bank-funded West African Agricultural Productivity Program and the USAID-funded West African Seed Program. In the framework of WAAPP, CORAF was instrumental in establishing nine Centres of Excellence for research on key regional commodities such as roots and tubers, rice, dry cereals and aquaculture. Given their regional character, facilitation and coordination of such time-bound activities is consistent with CORAF's mandate and targeted result areas. The subsidiarity principle applies, in that actual implementation of the activities involves consortia and leadership of NARS and main stakeholders in the sub-region...»¹

¹Wim Andriesse, Monica Kapiriri & Patrick van Damme. 2016. *Strategic Review of DEVCO support to African continental and sub-regional agricultural research organisations: FARA, AFAAS, CORAF, ASARECA and CCARDESA; ISS-FANSSA; Short Version, Final Report*; 19 p.

1.1. Enhanced Institutional Governance for Impact at Scale

1.1.1. Reaffirming our mandate and core function :

The status of implementation of the four recommendations and 11 resolutions of the 11th General Assembly (Niamey – Niger, June 2014) and those of the 18th session of the Governing Board (GB) of CORAF (Dakar - Senegal, December 2014) has been considered as satisfactory. Over the past two years, CORAF has successfully strengthened the capacity of NARS by improving institutional arrangements, promoting cooperation of all stakeholders and supporting the NARS in adopting the IAR4D approach through establishment of IPs. The revised statutes of the Institution were approved during the 19th Session of the Governing Board (May 2015) as part of the recommendations. The Scientific and Technical Committee (STC) continued to play its technical oversight role during the period. This included the evaluation and recommendation of proposals to the CORAF Governing Board and the development of the OP2.

1.1.2. Strengthened capacity of the Governing Board and ES:

The Executive Secretariat organized training sessions which, involved the Governing Board and some CORAF constituents and on Strategic Leadership and Governance in order to improve effectiveness in leading individuals and teams for superior sustained performance as well as Results Based Management and Monitoring and Evaluation. Based on the CORAF ES needs in the areas of M&E, Technical Program Support, and Communication, three young professionals were recruited for 2 years (2015-2016) with the support of AfricaLead(USAID/WA).

1.2. Improved Program Quality and Results Delivery of Research Outputs

1.2.1. Towards the ISO 9001 certification

The Executive Secretariat of CORAF has staunchly committed itself to meeting international standards, so as to better satisfy social demands related to food security and agricultural research in the sub region. As such, the Institution in 2015 met the qualification for the second phase of the ISO 9001 certification of its Quality Management System (QMS). The commitment of CORAF/ WECARD to implement a system approach to management reflects its dedication towards optimization and continuous improvement of its results, its procedures and to effectively consider all stakeholders' concerns. Key achievements are as follows: (i) Official launching of the Quality Management Process; (ii) Appointment of the Quality Team and process managers; (iii) Sensitization of the top management; (iv) Formalization of the process of Quality System, (v) Development of a draft Quality Management Policy, and (vi) Evaluation of the degree of satisfaction of CORAF's partners through a survey.

1.2.2. A Shift for Excellence in Management:

In order to be recognized as a high-performing organization in coordinating agricultural research for development and deliver better services to its stakeholders, CORAF went through an institutional audit from 2015 to 2016 supported by USAID/WA and facilitated by USAID/AfricaLead II. The Governing Board amended the audit findings and recommendations during its 21st Ordinary Session held in June 2016, in Dakar, Senegal.



Handover Ceremony between Dr Paco SEREME, Executive Director Ag (left). and Dr Abdou TENKOUANO, new Executive Director of CORAF (right) – April 29, 2016 in Dakar, Senegal



Handover Ceremony between Dr Harold ROY-MACAULEY, outgoing Executive Director (left) and Dr Paco SEREME Executive Director Ag. (right) – March 3, 2015 in Dakar, Senegal

1.2.3. Improved outcomes mapping through a robust result-based M&E system:

To effectively manage results delivery, the Executive Secretariat of CORAF ensures that Planning, Monitoring & Evaluation and Learning Unit tracks and reports on the key Performance indicators of CORAF and continues to provide technical backstop support on Planning, M&E in annual review and planning meetings of program and projects at NARS level to ensure effective results delivery.

1.3. Strengthened Regional Cooperation for Research and Development

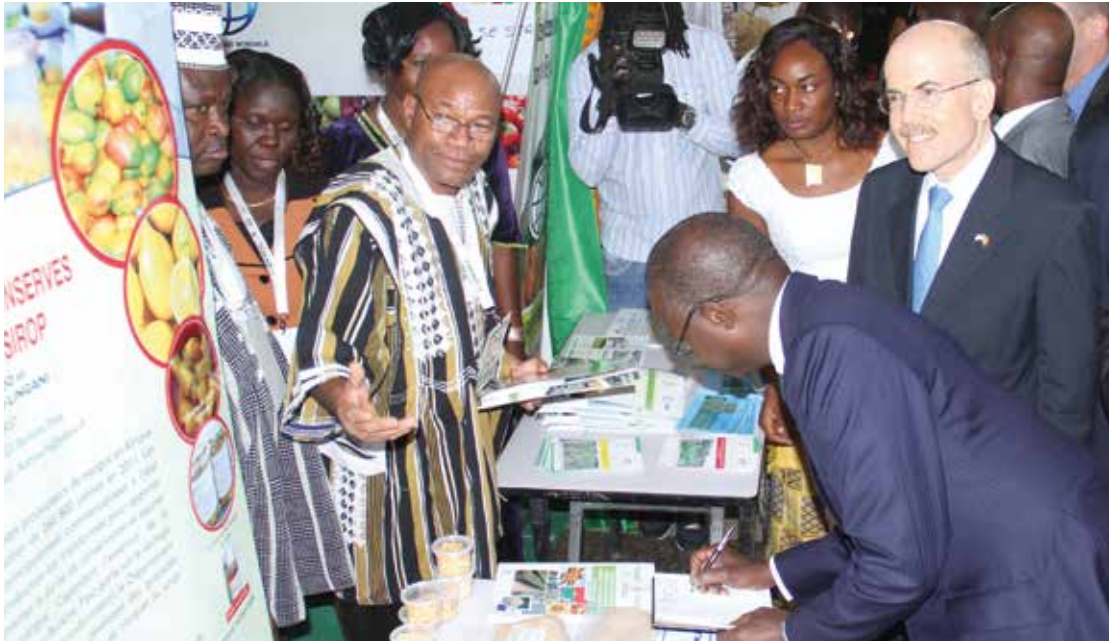
1.3.1. Taking stock of 10 years of contribution to the ECOWAP:

As the technical arm of ECOWAS, CORAF participated in the «ECOWAP+10» International Conference from November 17 to 19, 2015 in Dakar (Senegal) to take stock of the implementation of the regional policy, its operational modalities and programs while highlighting the achievements and lessons learnt over the last 10 years in terms of the general guidelines, content, priorities and governance. ECOWAP+10 provided an opportunity for CORAF to raise awareness on improved agricultural technologies generated as well as lobby for an increase in resources for agricultural research.

Besides CORAF organized a Special Forum and a Technology Fair on the ECOWAS-led program WAAPP opened by the Prime Minister of Senegal and invited dignitaries including the Director of Agriculture for West Africa at the World Bank, Dr. Simeon EHUI, to urge decision-makers, technical and financial partners (TFPs) for the uptake of the Productivity Program as a critical instrument for the achievement of future agricultural policy goals of “Eradicating hunger in West Africa by 2025”. Forum participants adopted a declaration to lead a new phase of WAAPP for the scaling up of technologies generated that take into account emerging issues regarding climate change, nutrition and youth employment. Moreover, a regional partnership pact for the implementation of ECOWAP/CAADP for 2025 was also adopted.

In collaboration with the World Bank, CORAF organized its First Open Competition for Best Innovation Platforms in West Africa. Four (04) best innovation platforms from Burkina Faso, Côte d’Ivoire, Niger and Senegal selected by an independent panel received awards for promoting successful experiences and lessons learned from the implementation of the innovation platform approach. At the sectoral Forum on “Financing the regional offensive for a sustainable and sustained revitalization of rice production in West Africa», CORAF also shared its experience, partnerships and networks established to achieve success in up-scaling rice seed production and supply to farmers in the ECOWAS zone.

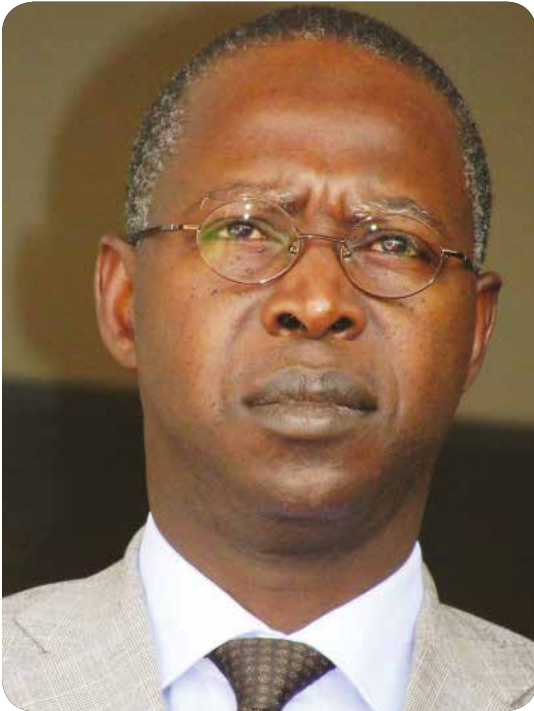
Box 1: The West Africa Agricultural Technologies and Innovations Fair at ECOWAP+10



The West Africa Agricultural Technologies and Innovations Fair held from 17 to 19 November 2015, was attended by the 13 WAAPP participating countries. The Fair enabled CORAF to broadly disseminate appropriate and relevant technologies that were generated as part of the program, to increase awareness and interest in the sub-region. These included success stories highlighting the socio-economic benefits of agricultural technologies, to demonstrate the link between all exposed technologies and emerging issues such as climate change, climate-smart agriculture, management of natural resources, as well as youth employment and income generation.

What they said:

His Excellence Mouhammad Boun Abdallah Dionne,
Prime Minister of Senegal



«The Government of Senegal is very satisfied by the contribution of CORAF in alleviating poverty and increasing access to agricultural technologies to our smallholder farmers. (...) We must continue to effectively transform our agriculture and no longer consider it as an activity for survival, an activity by default, but rather as a full-fledged economic sector where it is possible to invest and obtain returns on investment.»

Opening speech of the International Conference on West Africa Agriculture, November 17, 2015, Dakar Senegal

What they said:

Dr. Siméon EHUI,

Practice Manager of the Agriculture Global Practice
at the World Bank-Africa Bureau



«The achievements of WAAPP in scaling-up adoption of technologies and innovations are visible on the ground as it has significantly improved the nutrition and livelihood of local farmers. Therefore, the World Bank will remain committed to support CORAF and countries in order to spur agricultural development in West Africa.»

WAAPP wrap-up meeting - November 20, 2015, Dakar Senegal

What they said:

Dr. Aifa Fatimata NDOYE NIANE,
Agricultural Economist at the World Bank-
Senegal Bureau



«WAAPP has enabled the research sector to assert itself to be operational and to show all its capacity to generate agricultural technology and to support the training of young scientists for a significant increase in agricultural productivity in the sub-region. WAAPP is now positioned as an innovative model of regional cooperation and technology transfer.»

*Press conference of the Agricultural Technology and Innovations
Fair - November 13, 2015, Dakar Senegal*

1.3.2. Spurring world-class research coordination and cooperation through Regional Centers of Excellence

CORAF assists the NCoS on key priority commodities (Aquaculture, Banana & Plantain, Dry cereals, Fruits and Vegetables, Livestock, Maize, Roots & Tubers, Rice and Mangrove Rice) in their evolution towards Regional Centers of Excellence. In 2015, ECOWAS has approved the upgrading process of NCoS and CORAF made positive strides towards institutional arrangements and governance of Regional Centers of Excellence (RCE). In 2016, the governance model of the RCoE was presented to WAAPP member countries in Abuja Nigeria, where CORAF advocated for the ownership of NCoS-RCoE process by decision makers and head of Institutions that host the NCoS-RCoE. All the NCoS agreed to open doors of their governance and programs to the sub-regional and the international organizations CORAF will submit these set of recommendations to the WAAPP Regional Steering Committee for endorsement before review and adoption by the ECOWAS Ministers Council. CORAF/WARD also strengthened the capacity of NCoS in scaling out technologies generated, and conducting simple economic analysis on technologies and innovations introduced at farm level to determine their impacts and thereby document their benefits.

1.3.3. Quality seeds to fast-tack the recovery process in Ebola-hit countries:

2015-2016 was marked by the Ebola outbreak in West Africa which killed close to 10,000 people in Guinea, Liberia and Sierra Leone, and threatened the livelihoods of millions in the whole sub-region. This situation has resulted in food shortages in affected areas. Therefore, CORAF has played a major role in fast-tracking the recovery process of these countries by initiating a Post-Ebola Agricultural Rehabilitation Program. An unprecedented humanitarian response to prevent the looming specter of hunger for 1 million farm families was set in place with the supply of foundation seeds to be multiplied by producers and certified for immediate use by farmers. CORAF successfully mobilized 11,073 MT of quality seeds from 10 WAAPP member countries and from AfricaRice that were distributed to 240,000 family farms so far, 48% headed by women. The multiplication of foundation seed into more than 7,000 MT of certified seeds provided food for over 2 million people during the 2016 cropping season.

1.3.4. Championing Agricultural and Rural Advisory Services in WCA:

To facilitate extension and advisory services to farmers on the use of improved technologies and innovations, CORAF set in motion the West and Central African branch of the African Forum for Agricultural and Advisory Services namely "Réseau des Services de Conseil Agricole et Rural d'Afrique de l'Ouest et du Centre (RESCAR-AOC)". The RESCAR-AOC formalization workshop held in Abidjan in February 2015 was the opportunity to validate the results of the diagnosis of the state of agricultural and rural advisory services in West and Central Africa. Findings were used to define strategic orientations that position the RESCAR-AOC as a major actor in facilitating exchanges and synergies necessary to improve the performance and sustainability of agricultural and advisory services. The action plan for the operationalization of RESCAR-AOC was developed and a transitional period of 2 years was deemed necessary to refine and deploy the operating system in West and Central Africa.

1.4. IAR4D: From Proof of the Concept to Scaling Up

1.4.1. Celebrating five years successes of the IAR4D-IP approach

CORAF had received support from the Australian Department of Foreign Affairs and Trade (DFAT, formerly AusAID) under the Africa Food Security Initiative to institutionalize the IAR4D approach in West and Central Africa, in partnership with the Commonwealth Scientific and Industrial Research Organization (CSIRO). To capitalize the outcome of the partnership, an International Conference was organized in February 2015, in Senegal on the theme «Facilitating changes in farming systems in West and Central Africa through the implementation of Integrated Agricultural Research for Development (IAR4D)». The conference recognized the value and success of the IAR4D approach and its ability to bring innovations to smallholder farmers. Up to two hundred delegates including world experts on agricultural innovations from Europe, USA and Canada, Australia and Africa; representatives from the World Bank; DFAT-Accra Mission, and CGIAR Centers, producers and their associations participated in the conference. Partnership successes were documented in a booklet of change stories and case studies.



The conference high table at the opening ceremony. From right to left: Pr Jean Claude Adadedjan (President of CORAF STC), Dr David Bergvinson (General Director of ICRISAT), Dr Amelia Addison (Second secretary, DFAT Ghana-mission), M. Modou Mboup (Representative of the Minister of Agriculture of Senegal), Mrs Gisele D'Almeida (CORAF governing Board, representing the President of the Board), Dr Harold Roy-Macauley (Executive Director, CORAF) and Dr Aifa Fatimata Ndoye (Representative of World Bank, Senegal).

1.4.2. IAR4D: way forward for scaling up

Over the last decade, CORAF has operationalized and established over 330 IPs along commodity value chains ranging from crops, livestock, fisheries, and natural resources management across West and Central Africa. Analyses indicate that average annual income of participants in the IP has steadily increased. As farmers have access to low-cost and improved planting materials, their yields increased by over 50%, as well as their livelihood. Gross income of grain maize among IP actors increased from US\$ 544,000 in the 3rd year to over US\$ 2 million in the 4th year of participating in the IP in Burkina Faso. Also, average gross income of yellow grain maize per household increased from US\$ 449 to US\$ 804 within 2 years in The Gambia. In Cameroon, one IP with 225 hectares of plantain planted in 2012/2013 resulted in a production of 3,000 tons and income of US\$ 660,000 after a year. As a way forward, CORAF will capitalize on these achievements including issues related to institutional convergence or access to finance. IAR4D has matured enough to move on from linear transfer of technology to a sustainable public-private partnership and a more business-like model.

1.5. Enhanced Capacity Development and Technology Outreach for Agricultural Growth

1.5.1. Realizing the African Science Agenda in Agriculture:

The Science Agenda for Agriculture in Africa (S3A) launched in 2014 in Johannesburg is an African-owned instrument for achieving the CAADP target of doubling agricultural productivity by 2025. For its implementation, a Science for Agriculture Consortium (S4AC) was set up to mobilize the collective capacity and social networks of FARA, the Sub-regional Organizations (SROs) including CORAF and AFAAS at country and sub-regional levels. The S4AC was unveiled to agricultural research and development stakeholders in April 2016 at the 3rd Global Conference on Agricultural Research for Development (GCARD3) on Agri-food Innovation and Research for a Sustainable World in Johannesburg, South Africa where CORAF shared experience on the West Africa Agricultural Productivity Programme as a Scaling Model for Regional Integration and Agriculture Transformation in the Sub-Region". In September 2016, founding partners met at the World Bank Group in Washington DC to draft a proposal for the S4AC including concept notes on two research projects namely Climate smart technologies and Post-harvest losses. Based on the success achieved the World Bank has accepted to release funds to conduct institutional analysis to inform the proposals on the current capacities of the consortium institutions including CORAF.

1.5.2. AfDB buy-in of low cost – High yielding technologies generated by CORAF:

The new AfDB's Agricultural Transformation Agenda (ATA for Africa) aims at eliminating poverty and hunger through increased self-sufficiency and greater agricultural exports. The Technologies for African Agricultural Transformation (TAAT) proposal was presented to the AfDB on February 16th, 2016 by the CGIARs led by IITA and FARA. The TAAT programme will be driven by a Clearing-house mechanism to provide strategically designed loans to member countries and advance its new ATA around eight priority programmes.

CORAF contributed during strategic meetings held at FARA (14-16 March, 2016) and at IITA, Ibadan, Nigeria (11-15 April, 2016) on the joint FARA-CORAF-ASARECA-CCARDESA-AFAAS proposal on Capacity Development and Technology Outreach for the AfDB's TAAT. With a comparative advantage to boost for impact at scale, TAAT expressed the willingness to capitalize on CORAF experiences on Regional Coordination Mechanisms of multinational programs such as WAAPP and WASP to be used as a model for its 'Clearing House Mechanism'. Six low cost and high yielding technologies (Floating fish feed pellet, Fish smoking kiln, Densified multi-nutritional blocks for improving livestock feeding, Rainy season resistant tomato varieties, System of rice intensification -SRI, and Intercrop diversity tradeoffs cocoa farms) were proposed to the AfDB initiative for up scaling and wide dissemination.

1.6. Integrated Gender Transformative Approaches in Regional Initiatives

1.6.1. Leading the ECOWAS Climate Smart Agriculture Gender Task Force:

As member of the ECOWAS Climate Smart Agriculture Task Force (ECCORAF), CORAF provided guidance for the formulation of the Regional Action Plan under the facilitation of AfricaLead. The contribution of CORAF to have gender mainstreamed in the ECOWAS Climate Smart Agriculture Framework has been commended by all stakeholders.

1.6.2. Advocating for more Gender equity within National Agriculture and Food Security Investment Plans (NAIPs);

During the Technical Workshop on Supporting the Appraisal of National Agriculture and Food Security Investment Plans (NAIPs) – organized by IFPRI, AU, and NEPAD, CORAF shared experience on gender inclusion in AR&D programs and projects, and presented a potential Gender strategy for the new generation of the NAIPs. This has been acknowledged and appreciated by ECOWAS.

1.6.3. Supporting Women in accessing quality seed:

CORAF made room for an allocation of 50% of the resources of the Rice Seed Up-Scale initiative, to support 'Women in Seed System'. As a result, women's active participation in the seed sector increased and their access to certified seeds improved. A grant of USD 100,000 USD was given to two groups of women, FASO KABA in Mali and FEPRODES in Senegal. The WASP support allowed FEPRODES to double its production capacity with over 5 ha of foundation seed, and 20 ha of certified seed in 2015. It is also planned to support seed multiplication, processing and commercialization, for groups of women and youth in Mali and Senegal.

1.6.4. Consultations on « the potential of women and youth in the sustainable transformation of the agricultural sector in West and Central Africa »

The E-conference organized between April and May 2015 aimed at contributing to an improved harnessing of the potential of women and youth in the sustainable transformation of the agricultural sector in West and Central Africa. The online discussion resulted in valuable recommendations to overcome some of the challenges that are hindering effective integration of gender dimensions into agricultural innovation discourses and practices. One of the recommendations was that strategic actions must be undertaken to support awareness-raising and access to information for women, youth and communities as well as to build the capacity of law enforcement institutions about existing policies, legislation and tools to support women's access to land and agricultural productive resources and value chains. Key outcomes were Action Plans, Advocacy and Policy Notes developed so as to improve the process of gender mainstreaming in the agricultural research and development agenda in West and Central Africa.

1.7. Scaling up Technologies and Creating Competitive Agribusiness Enterprises

1.7.1. A tailored entrepreneurial model to engage youth in agribusiness :

CORAF took a more holistic and systematic approach to engaging young people by facilitating and meeting the knowledge needs of small and medium size enterprises and domestic agro-industry stakeholders in agribusiness development. To develop a compelling and well-rounded model for Youth Agripreneurships, CORAF teamed up with the Islamic Development Bank (IsDB) under the "IsDB initiative for inclusive social development' towards empowering the youth in its member countries» with further support from the World Bank under WAAPP. So far, the capacity of over 1,000 young agripreneurs, with at least 40% being females were strengthened through an online mentoring program and more than 200,000 youths are reached through the web diffusion of documentary films on high impacts agricultural technologies. Based on these outstanding impacts, the program was among the Top 10 finalists of the 2016 Islamic Development Bank Group Innovation Competition in the Innovative Projects Category.

1.7.2. Empowering the private sector for seed industry development:

CORAF has contributed to strengthen public-private partnerships at national and regional levels for sustainable production and supply of breeder, foundation and certified seeds. CORAF has also assisted the private sector and created champions in the transformation of the seed business from informal to formal sector. Business development support (BDS) were provided to 1,400 seed SMEs in developing their Business Plans to give a new direction to the West African seed industry. CORAF also strengthened the institutional capacity of 7 National Seed Trade Associations in West Africa. In 2015, the technical assistance and coaching provided to the selected SMEs by the WASP resulted in the access of grants by two private enterprises, totaling US\$ 48,000 in Benin. Interestingly, the National Seed Trade Association of Nigeria (SEEDAN) successfully leveraged a loan of US\$ 2,000,000 from the Bank of Agriculture (BOA) in Nigeria for its members using part of the CORAF's grant as guaranty funds. With the loan agreement, SEEDAN member companies stepped up the production of 800 tons of certified seeds from 16,000 out-growers.

1.8. Influencing ECOWAS Regulations for Policy Change & High-level Stakeholder Ownership

1.8.1. Effective deployment of the Harmonized Regional Regulation on Seeds, Pesticides and Fertilizers

CORAF has successfully facilitated the effective implementation of the ECOWAS-UEMOA-CILSS Harmonized Seed Regulation in 17 countries. The inclusive approach used by CORAF has resulted in a remarkable increase in implementation from 41% in 2013 to 87% in 2016 and has fostered intraregional trade through the development of a favorable policy environment.



1.8.2. Promoting Regional Trade of Livestock-Meat-Milk and peaceful transboundary livestock transhumance:

CORAF as the sub-regional Focal Point for the Sustainable Management of Animal Genetic Resources of ECOWAS, has greatly contributed to the improvement of Livestock policies/regulations/standards and their articulation with other public policies at national level as well as building the capacity of actors of value chains. An Action Plan to promote Livestock and Meat Trade in the Central Corridor was also elaborated to facilitate regional trade from Burkina Faso and Mali to Côte d'Ivoire, Ghana and Nigeria. Concrete actions were also undertaken towards a sustainable management of conflicts related to transboundary livestock transhumance. Good practices in prevention and management of conflicts were promoted and local committees were established for managing conflicts between farmers, herders and local leaders. During the High-Level Consultation on Trade in Livestock, Meat – and sub-products, held in 2015 in N'Djamena, Chad, CORAF was at the forefront of political advocacy and dialogue to facilitate regional trade of livestock/meat and for a peaceful transboundary livestock transhumance in the ECOWAS zone.



1.8.3. Creating enabling policy environment for adaptation to climate change in Africa:

CORAF undertook a stock-taking of research as well as policy related to climate change adaptation in agriculture, health and urban areas to provide required evidence to effectively inform policy makers who would use such information to make relevant policies that will enhance adaptation of their respective people and communities to the adverse effects of climate change. CORAF succeeded in sensitizing relevant policy makers through dialogue and encouraged them to use scientific evidence in decision making. It also leads the formation of a body of scientists dubbed the African Group of Experts (AGNES) to support the African Group of Negotiators by providing scientific evidence that will help them in making reasonable and convincing submissions on behalf of Africa in the climate change negotiations.

1.9. Strengthened Strategic Partnerships for Transformation of Agriculture

1.9.1. Advocacy towards extending the Agricultural Productivity Programme:

Intensified advocacy with the World Bank on the one hand and on the other hand, with the Member countries for greater involvement in the Agricultural Productivity Program for Central Africa (CAAPP) continues, as well as expanding WAAPP to the remaining ECOWAS countries.

- **In the ECCAS zone:** CORAF has strengthened its advocacy towards the authorities of the countries of Central Africa on the importance of the CAAPP for the implementation of agricultural policies in that region. In 2015, these activities allowed the formulation of important resolutions on the CAAPP starting at the meeting of Ministers of Agriculture of ECCAS and continued with a high-level meeting on Livestock Trade all in Ndjamena in Chad. Advocacy continued at the World Bank in 2016 to get support for the CAAPP. Two countries (Cameroon and Chad) have finally decided to join WAAPP in order to benefit from its 10-years' experience.
- **In the ECOWAS zone:** Over the 2 years, CORAF also made significant progress on consultations with Mauritania, Cape Verde and Guinea for their effective integration into the WAAPP. There has been progress with Cape Verde and Guinea who have joined the program. Now WAAPP included all the 15 ECOWAS countries.

1.9.2. Expanding reach through innovative partnerships:

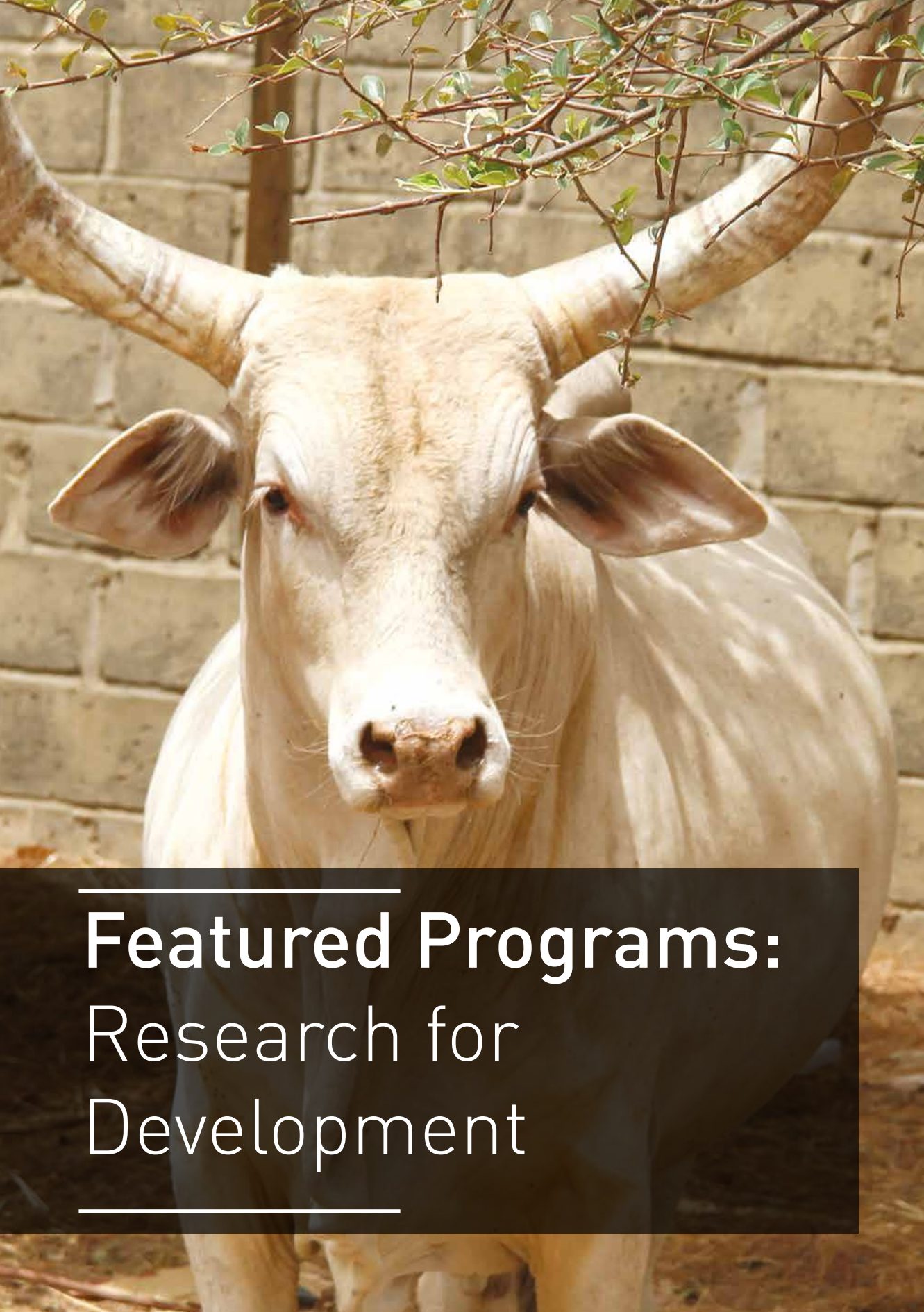
The intense consultation of CORAF with its stakeholders, mostly AfDB, CILSS, ECOWAS, EU, and IFDC has led to strengthened partnership and new initiatives for agricultural research and development, and technology outreach.

- **With AfDB :** CORAF had a high-level meeting with AfDB in February 2015 to map out areas for strengthened partnerships in support of the OP2. Two areas were identified: (i) Dissemination of Science and technology generated by NCoS, and (ii) Multiplication and dissemination of trypanotolerant ruminant livestock in countries affected by Ebola (Guinea, Liberia, and Sierra Leone) and neighboring countries (Côte d'Ivoire, Gambia, Mali, and Senegal).
- **With CILSS :** Throughout 2016, CORAF strengthened its partnership with CILSS by sharing its experience on Research for Development, Technology Outreach, Communication, Monitoring and Evaluation for adaptation within the two regional initiatives namely the Sahel Pastoralism Support Project (PRAPS), and the Sahel Irrigation Initiatives Program (SIIP), both funded by the World Bank.
- **With ECOWAS :** In April 2016, within the framework of the agricultural policy of ECOWAS, CORAF was called upon to support countries in the sub-region in the formulation of the 2nd generation of the NAIP and the RAIP. As a regional cooperation organization and technical arm of ECOWAS, CORAF was to provide expertise throughout the process of strengthening innovation and research coordination capacity, technology dissemination and knowledge sharing, seed policy and marketing as well as biotechnology and bio-safety.

- **With EU:** Under its resource mobilization strategy for the MDTF projects, CORAF strengthened its relationship with the European Union. His Excellency, Mr. Joaquin González-Ducay, the EU Ambassador to Senegal and his delegation visited the Executive Secretariat of CORAF where the overall results of the projects, particularly those funded by MDTF to which the EU is a contributor were shared. The delegation then travelled to Kaolack (200 km, East of Senegal) to visit the Innovation Platform of an MDTF funded project on 'Support to sustainable improvements in productivity and competitiveness of dairy sector in West and Central Africa (AMPROLAIT). This visit was instrumental in demonstrating the effects of the project and the innovative approach used to increase income and reduce poverty in rural areas.



- **With International Fertilizer Development Center (IFDC):** In September 2016, CORAF and IFDC signed a MoU that aims to promote research-based production technologies towards enhancing crop productivity and facilitating public-private partnerships (PPPs) in order to improve small holder farmers' access to markets including women and youth to stimulate a rapid economic growth, food insecurity and poverty reduction in WCA.



Featured Programs:
Research for
Development

2. Featured Programs – Research for Development

The Directorate of Research and Innovations continued to provide technical support to programs and project implementation and scientific cooperation activities in collaboration with NARS and partners. It also provided support to the Executive Director in carrying out advocacy missions. Scientific cooperation activities implemented were geared towards strengthening on-going partnerships, initiating new ones, and creating an enabling environment for the delivery of targeted programs outputs and outcomes. This section presents the main outputs, immediate outcomes and impacts delivered by all the programs.

2.1 The Multi-Donor Trust Fund (MDTF)

The Multi Donor Trust Fund (MDTF) is a US\$ 21 million support provided by the European Union and the Canadian International Development Agency (CIDA) to CORAF. The MDTF has made a significant contribution towards enhancing the capacity of CORAF in effectively coordinating agricultural research for development in WCA. Overall, the MDTF mechanism has enabled the implementation of joint donor support to CORAF in terms of institutional priorities (regional mandates, management, administration, monitoring and evaluation, program coordination, gender mainstreaming, quality management, etc.) and of thematic priorities (IAR4D and Value Chain approaches, and focal programs). It has allowed a smooth and efficient reporting and disbursement mechanism to the single monitoring agency which is the World Bank.

2.1.1. Improvement of CORAF Governance and Administration

The MDTF funding provided support for governance, administration and change management. In this regard MDTF was the major source of support for core funding and operations of most of the programmes during the OP1. Since the beginning of the OP2 this proportion has further increased due to the phasing out of some sources of bilateral support. Funding mobilized under MDTF has contributed to strengthening the governance and administration of CORAF through the establishment of an internal audit unit, the review of its constitution, and governance and framework manuals as well as the renovation of physical infrastructures of the Executive Secretariat.

CORAF now has a fully operational Monitoring & Evaluation system in place and a Gender Strategy and Action Plan being implemented.

2.1.2. Prompting Change Management in Agricultural Research and Development

The MDTF support to CORAF's projects has offered credible evidence that functional innovation platforms (IPs) do help to facilitate the implementation of IAR4D activities on the ground. The IAR4D paradigm of program delivery was a major outcome of this change management process by facilitating demand-driven research and technologies, the exchange and dissemination of these technologies/innovations and positive spillover effects to other value chain actors. Scaling up the IAR4D approach throughout the region is contributing to further strengthen the NARS, as these become more relevant and responsive to clients as well as strategically positioning CORAF as a regional leader in agricultural research for development in WCA.

CORAF has also embarked on the process of institutional audit with an extensive review and formulation of recommendations on innovative programming and technical delivery systems, knowledge management, financial management systems and human resources management. Full implementation of these recommendations will lead to the ISO Certification of scientific quality and performance management of the Executive Secretariat.

2.1.3. Fostering quality delivery of CORAF Results

MDTF has supported 17 projects (29% of total number of projects implemented by CORAF based on its Strategic Plan). Over the past five years the MDTF projects have benefitted a total of 65,122 individuals (42% are female) representing 80% of the targeted beneficiaries of the programme.

Also, 138 promising technologies and innovations have been generated, disseminated, and adopted. The large number of satisfied beneficiaries suggests that these technologies and innovations will continue to be used in the foreseeable future. Impacts can already be seen in the artificial insemination of cows and feeding based on local ingredients. Finally, over 2,000 stakeholders have received short-term and long-term trainings in natural heat and supplementary feeding. This investment in large-scale capacity building and knowledge development can be expected to pay large dividends and further enhance the development outcome in the future.

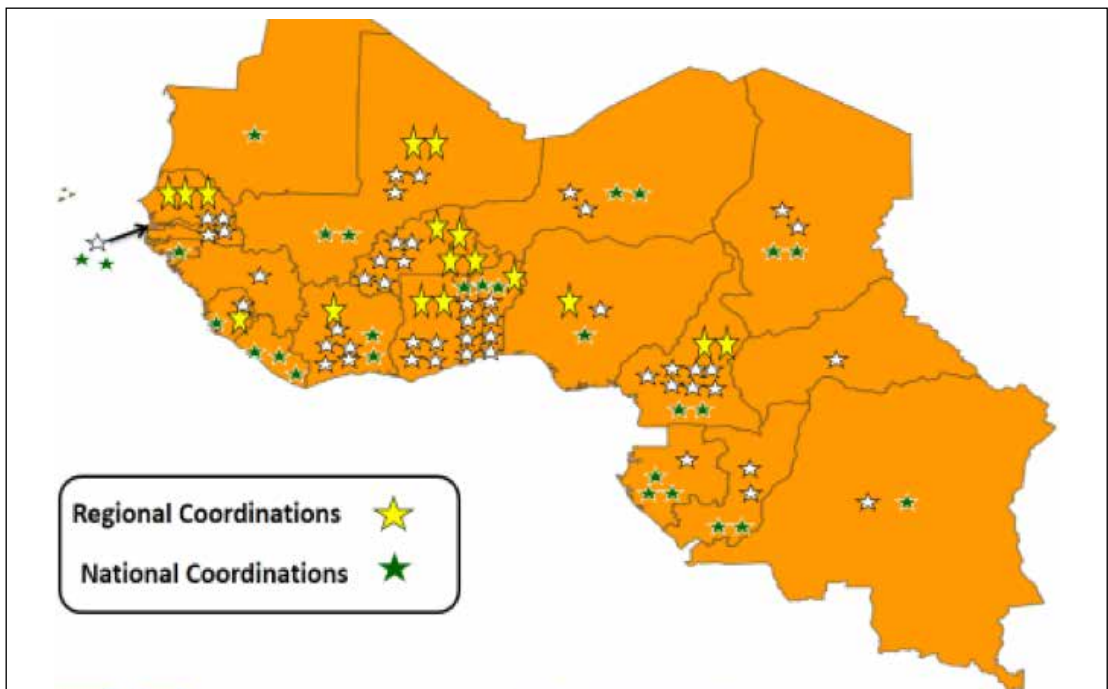


Figure 1: MDTF projects implementation in West and Central Africa

2.1.3.1. Result 1. Increased use of appropriate technologies and innovations in WCA

A total of 138 technologies/innovations were generated since the initiation of MDTF projects in 2012. These were made possible thanks to (i) 60 multi-stakeholder's partnerships and mechanisms established, (ii) 315 partnerships formed around the competitive and commissioned projects, and (iii) 112 IPs associated with the 17 projects.

- **In the Livestock, Fisheries and Aquaculture Programme:**

A more efficient and cost-effective protocol of artificial insemination (AI) based on natural oestrus, has been developed with livestock farmers actively involved in the process of oestrus detection. Preliminary results from the dissemination and use of this protocol show an increase in the success rate of artificial insemination, from 30% to 38%.



A balanced feed ration for dairy cow based on locally available feed resources. Rations made of forage ad libitum + 1 kg of maize bran, 1.5 kg cotton cake among others have led to an increase in milk production from 1.91 ± 1.13 to 4.12 ± 2.06 liters/cow/day in the extensive livestock farming system during the dry season.

Integrated aquaculture technologies developed : This activity has successfully achieved almost a 100% waste utilization as nearly all the waste products of the integration have been successfully utilized under various production systems. For instance, wastes from the poultry were used for maggot production and pond fertilization while the offal from the processed fish were used in fish meal and fish oil production. The waste from rice processing are used in production of rice bran which is energy yielding feedstuff in fish and poultry feeds.

A low cost floating feed pellet based on locally available feed resources developed: Average weekly weight gain of 38.10 ± 2.16 g was recorded during two trials. A mean initial weight of 80g and stocking density of four fish per m², an average weight of 780 g was achieved in three months of feeding with the floating feed. This floating feed will soon be commercialized and made available for fish farmers by a private company in Nigeria. This is expected to bring over 80% reduction in the cost of catfish feed in the target countries.



- **In the Crops Programme**

Development of new methods for reducing aflatoxin contamination: In Burkina Faso and Mali, two (2) types of improved storage of peanuts are offered to producers. One room attic which uses a blend of two plants *Hyptis suaveolens* and *Hyptis lanceolata* at a proportion of 1:1 and the double room attic which uses the smoke coming from the second room that is used as kitchen and the first one as a storage room. Tests performed after six months of storage in the double-room attic showed the absence of Aflatoxin.

Thirty-eight (38) Tomato varieties tolerant to *Ralstonia solanacearum* (Smith) Yabuuchi identified in Senegal and Burkina Faso: of the eight varieties tested in Senegal, six have proven tolerant to bacterial blight. These are: MAKIS F1 (V9), PLATINUM 701 F1 (V10), F1 COBRA 26 (V2), GOOD YEAR (V8) F1 THORGAL (V1) and Mongal F1 (V4 / control). Among the 11 varieties tested in Burkina Faso, 3 proved to be tolerant. These are «Lindo F1» Cobra and «buffalo». These varieties had similar behavior as the tolerant check (Mongal).

A Zero Energy Cooler Chamber (ZECC) has also been developed by the Institute of Research in Applied Science and Technology / Institut de Recherche en Sciences Appliquées et de Technologie (IRSAT) of Burkina Faso for fresh fruits and leafy traditional African vegetables (TAVs) storage using traditional tools. IRSAT has also developed a manual for good postharvest handling and hygiene practices Traditional African Vegetables (TAV) storage and processing. The ZECC can preserve fresh vegetable for up to four days and is suitable for use by small scale commercial processors. The efficacy test of the ZECC will continue with producers and farmers in their own sites.



A Zero Energy Cooler Chamber

Five (5) morphological traits of interest from cotton have been identified. Seeds of five genetic materials bearing the five morphological traits were obtained to initiate crosses with African varieties to obtain isogenic varieties keeping qualities of African-fortified varieties and morphological traits of interest. The crossing work is done jointly with Burkina Faso and Togo, but also in Cameroon. In all three countries, the transfer of morphological traits is done on two separate African varieties, in the form of 10 crosses giving 10 isogenic varieties

- **In the Natural Resources Management**

Enhanced understanding of biodiversity and shade management options in cocoa agroforestry systems obtained. An inventory of 3200 fruit trees and 1832 forest trees belonging to 46 species made from 60 cocoa orchards in Cameroon revealed existing biodiversity associated with cocoa farms. Optimum shade management has been identified among the common cocoa agroforestry systems resulting in enhanced biodiversity, improved disease management and increased income to farmers particularly women who are increasingly being given the opportunity to harvest and sell produce from associated fruit trees.



A correlation between farmers ranking and primary nutrient content of tree leaves has been determined in Cameroon: There appears to be a positive correlation between farmers ranking of local tree species found in their fields with the amount of primary nutrients (N, P, K g/ka) contained in the litter collected under the trees. The tree species *Milicia excels*, *Ceiba pentandra*, *Ficus mucoso*, and *Alstonia boonei* were ranked among the first four by farmers. These species also had the highest NPK contents. This finding has provided the opportunity for farmers and researches to collaborate in enhancing the productivity of the system particularly with regards to soil fertility management with preferred and productive components that will increase farmers' income.

Pattern of introgression of Sahelian zebu genes into the taurine cattle of Southern West Africa identified: The zebu admixture proportions estimated were not negligible and were always higher in the N'Dama cattle than in the Lobi cattle of Burkina Faso. This suggested that the introgression of Sahelian zebu genes into the taurine cattle of Southern West Africa can follow a complex pattern that can depend on local agro-ecological features. The current research pointed out that the estimation of admixture coefficients is highly dependent on both the assumptions underlying the methodologies applied and the selection of parental populations. Our analyses suggest that either too high or nil genetic identity between the parental and the expectedly derived populations must be avoided.

Utilization of urban waste in peri urban agriculture improved: a study covering Burkina Faso, Senegal, Togo, Congo, Cameroon and Sierra Leone has revealed risks in contamination with bacteria and heavy metals. Awareness messages have been shared with women vegetable growers as well as methods for safely handling urban waste. Six different types of composts were produced from three solid waste of the city of Ouagadougou for use in vegetable production. The use of such composts has had a positive effect on productivity of crops as well as a reduction in the risk of contamination of the women.

2.1.3.2. Result 2: Strategic decision-making options for policy and markets developed

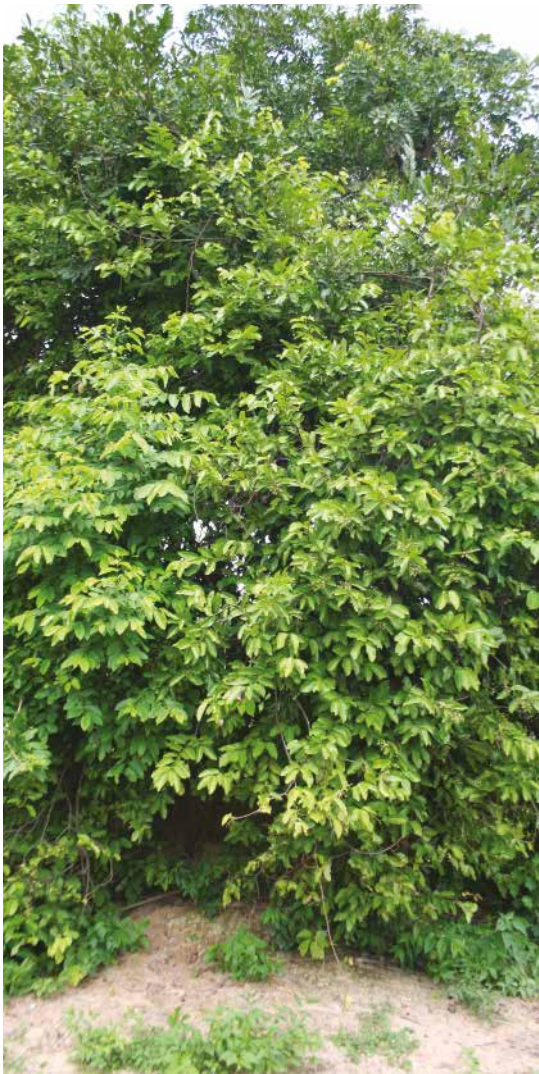
Thirty-four (34) strategic policy options proposed/recommended and advocated towards decision makers at regional and national levels have been generated and proposed.

Strategies for conservation of local cattle breeds developed: Key strategies were drafted and included selection and cross breeding for improvement in the conservation of animal genetic resources based on prevailing conditions in the respective countries. These strategies when finally shared with relevant communities will greatly help in conserving the valuable Ndama breed.

A strategic decision-making option for integrating the bio-digester into the dairy farming systems developed based on the findings of an assessment of the socio-economic and environmental impact of bio-digesters in the context of dairy farming systems in Senegal and Burkina Faso. This will improve productivity, health and the livelihoods of smallholder families. With these options, policy briefs and action plans are under development to update existing or develop new policies and strategies for livestock development in the sub-region. The Policy briefs will then be shared with the Ministries in charge of Livestock, through the ECOWAS Network.

Strategic options for policy to address access to fund and to land by family fish farmers identified: Environmental assessment of the ecological intensified extensive fish farming systems using the “Life cycle analysis”: the environmental negative impact is low compared to the other fish farming systems. The result of this analysis will serve in getting a certificate of environmental conformity and elaborating an advocacy paper in order to increase the access to funding

Strategic innovation options of natural resource management based on Non-Timber Forest Products were identified and proposed: In Burkina Faso platform actors identified three categories of innovative strategic options based on the following objectives: (i) Focus on sustainability of shea resource, (ii) Promote the recovery of shea kernels, (iii) Strengthening the capacity of stakeholders and promoting communication in the areas of sustainability and enhancement of the shea resource. Strong advocacy was made to policy makers through their involvement (i) in the Non-Timber Forest Products’ activities in Gabon, and (ii) in the revision of the New Forest Code of Senegal.



2.1.3.2. Result 3: Sub-regional agricultural research system strengthened and coordinated

Prior to the implementation of MDTF, scoping studies were conducted to identify priority intervention areas, including sets of capacity strengthening needs of stakeholders along the value chains. The evaluation of the Change Management Program (CMP) indicated that 80% of the needs of CORAF stakeholders identified were met through the training in various areas. A total of 27 543 (comprising 15,543 males and 11,915 females) individuals in various categories benefitted from short term training while 206 benefitted from long term training mainly MSc and PhD through the 17 MDTF funded projects. These figures surpass the targets of 16,140 and 152 for short and long-term training, respectively.

- **In the Livestock, Fisheries and Aquaculture Programme**

More than 2,000 value chain actors trained in various areas of improving the productivity and the competitiveness of local milk, in oestrus detection of local cows and optimization of AI on natural oestrus as well as in hygiene and quality of local milk in Burkina Faso and Senegal;

Capacity of the undergraduate and postgraduate students of 15 universities and 4 colleges of agriculture enhanced through the use of the adaptive facilities for research and training of the Integrated Aquaculture System with rice and poultry MDTF supported activities in Nigeria: over 3,500 hundred students have been trained through this process, out of which 1,400 are females; 1,494 farmers trained, out of which 539 farmers were women and youths.



- **In the Crops Programme**

A total of 300 producers and extension agents (50 from each of the 6 participating countries) received training (as trainers of trainers for the dissemination of best practices in their respective countries) on various issues of cotton production ;

A total of 6840 people in 4 countries including 3195 women (43.03%) and 3897 men (56.97%) have had enhanced awareness of aflatoxin and its impact on health. These people are expected to further sensitize their compatriots.

- **In the Natural Resources Management Programme**

A total of 170 vegetable producers (comprising 95 females or 56%) had enhanced capacity in safe handling of organic waste and in managing city waste as a source of organic manure for vegetable production; Almost 500 pastoralists including 25% of women across the project countries have had increased awareness on the need to preserve the “Ndama” breed in addition to improved management of cattle.

The INERA laboratory has received a range of equipment that has enabled the institution to carry out DNA extraction, DNA quantification and quality control, PCR amplification for diagnostic and genetic characterization and Safe storage of samples. It should be noted that at the beginning of the project samples for all the analysis were sent to a partner laboratory in Spain. Now the required analysis involving samples from the eight additional countries that have been included in the project are now done in this INERA laboratory. The laboratory is also used to train technicians and other scientists from the region.

A «Soils and Environment» module for Master in Soil Sciences has been developed at the University of Ouagadougou. The module has provided an opportunity to enable hundreds of students to address relevant issues related to health and nutrition.

2.1.3.4. Result 4: Demand for agricultural knowledge from target clients facilitated and met

In the context of MDTF projects, CORAF has established more than 112 functional Innovation Platforms in 22 countries in WCA through which the demands of stakeholders were assessed, analyzed and satisfied. As complements to the innovation platforms, many other tools were established among which were: (i) a regional database on achievements made in agricultural research and development and containing information on scientific publications, new technologies, best practices, directory of researchers, and projects, (ii) a Market Innovations and Agricultural Technologies electronic platform (MITA), which collects and makes available information on relevant existing but not widely known or used technologies in WCA countries, (iii) West Africa Seeds Information Exchange (WASIX), an electronic forecasting platform to enhance seed information exchange and marketing; (iv) Partnerships with other regional knowledge management programs such as ECOAGRIS (ECOWAS), RAILS and Africa Adapt (FARA). The IPs and these initiatives have provided forum for learning and sharing of knowledge which have significantly contributed to the development and use of technologies and innovations generated.

2.2 The West Africa Agricultural Productivity Program (WAAPP) : Regional Integration in bridging Food and Income Gaps

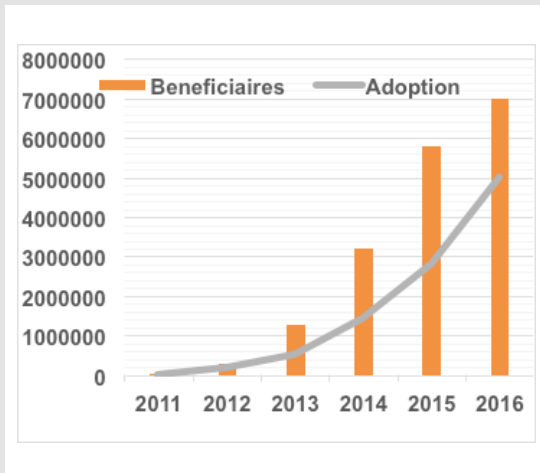
Started in 2008, the West Africa Agricultural Productivity Program (WAAPP) is an initiative of ECOWAS under the facilitation of the World Bank and the coordination of CORAF. WAAPP aims at generating and accelerating the adoption of improved technologies, strengthening and upscaling regional cooperation to facilitate increased sharing of agricultural information, knowledge and technology in the participating countries. WAAPP is being implemented in 13 countries of ECOWAS according to the following series: WAAPP A (Ghana, Mali & Senegal), WAAPP B (Burkina Faso, Côte d'Ivoire & Nigeria), WAAPP C (Benin, Gambia, Guinea, Liberia, Niger, Sierra Leone & Togo). Now with the new generation that includes Cape Verde and Guinea Bissau, all the 15 countries of ECOWAS are participating in WAAPP.

During the period in review (2015 to 2016), the CORAF-led program has reached a cruising speed in adoption and use of technologies and performance. WAAPP has reached the stage of maturity and recorded visible achievements in the field. Many technologies have come out of research institutions and are currently transferred for use by farmers and other end users, both inside the countries and across national borders.

2.2.1 Scoring highly on alleviating poverty and food insecurity in West Africa

WAAPP, was nominated as the second-best World Bank project in Africa in 2016. This recognition is thanks to WAAPP outstanding contribution to boost the West Africa's food system, to innovate, create, disseminate and adopt improved technologies as well as to create favorable conditions for regional cooperation in 13 participating countries.

This tremendous progress is fueled by its high capacity to transform West African agriculture by boosting productivity by over 50%, reducing hunger and improving nutrition through improved and drought resistant crops, creating thousands of jobs and supporting agricultural technologies transfer across borders. By increasing the yields of major crops between 30% and 150%, WAAPP had a great impact on food security and caloric intake, rising from 2,777 kcals to 2,964 kcals and the "hunger period" reduced by 28 to 55% depending on commodities. WAAPP is estimated to have increased food production in West Africa by more than 3 million tons and has also contributed to increase by 34% the economic situation of target farmers and actors including women and youths in West Africa.

BOX 1: Key Results of WAAPP

- 6,797,396 direct beneficiaries in 13 countries in West Africa with 45% of women producers
- About 30 million indirect beneficiaries
- 198 technologies generated with yield increase from 30% to 150%
- 2,835,718 processors and producers have adopted new technologies generated
- 3,094,170 hectares under new technologies generated by WAAPP
- 1,021 young researchers trained in MSc and PhD

2.2.2 Scaling up family farming through high yielding technologies

To date, WAAPP has successfully generated over 198 technologies including early maturing, pest and drought resistant varieties and climate-smart techniques with yield increase from 30 to 150%. These promising technologies are directly benefiting to over 7 million farmers, processors and small businesses across the region (45% of whom are women) and about 30 million indirect beneficiaries. Improved technologies generated are effectively used on close to 4 million hectares across the West African region.

Box 2: Marketplace of Agricultural Technologies and Innovations (<http://mita.coraf.org>)

One of the major areas of WAAPP is to facilitate the dissemination and adoption of technologies by farmers. In this context, with the support of the World Bank, CORAF has set up a Marketplace of Agricultural Technologies and Innovations (MITA). So far, 161 out of 198 technologies generated by the NCoS are available on the platform. MITA is also updated with a depository of 1010 researchers' database up-loaded from 7 out of 13 countries which are Senegal (71), Ghana (72), Burkina Faso (211), Sierra Leone (67), Benin (413), Togo (103) and Mali (73). Since the restructuring of MITA, the number of visits has considerably increased. As of December 2016, the number of visits was over 640,000 views.

2.2.3 Breaking boundaries by enabling regional technologies transfer

To support regional integration in agriculture, WAAPP has successfully matched demands among countries by facilitating the transboundary exchange and adoption of technologies, knowledge and expertise across participating countries. More and more technologies are crossing borders. These include: (i) rice seeder from Mali which is disseminated in 5 countries; (ii) composite bread technology (mixture of local cereal and wheat flours), launched in Senegal, is now spreading in 5 other countries; (iii) high-yield varieties of cassava and sweet potatoes with orange flesh from Ghana are disseminated in 3 other countries; (iv) parboiled rice production equipment from Guinea is being adopted in 4 countries; (v) rainy season tomato varieties from Burkina Faso are now adopted in 3 countries.

2.2.4 Adopting a value chain approach to accelerate the adoption of technologies

To accelerate the adoption of the technologies and innovations generated, WAAPP is promoting the IP mechanism. More than 150 IPs were set-up across the sub-region on the major commodities value chains which are also supporting information sharing, and adoption of technologies released by the NCoS. The use of this multi-stakeholders and collective learning approach within its national networks has contributed to reach some 3,000,000 smallholder farmers effectively using improved technologies in 2016 as compared to only 305 000 in 2012.

2.2.5 Pooling research expertise on priority commodities for technologies generation

CORAF has strategically set up 9 National Centers of Specialization (NCoS) on priority commodities to maximize human and financial resources and avoid duplication of research in the sub-region.

The NCoS will evolve to Regional Centers of Excellence (RCoE) and this is considered by CORAF as a strong tool for regional and international cooperation and networking that can mobilize human, financial and material resources to achieve the scientific objectives whose results are applicable or adaptable by other countries with similar development concerns.

BOX 3: The 9 National Centers of Specialization (NCoS) of WAAPP



The NCoS were set up based on the priority commodities of the sub-region identified by IFPRI (2006) thus: (i) Rice, located in Mali, (ii) Mangrove Rice in Sierra Leone, (iii) Roots & Tubers in Ghana, (iv) Fruits and vegetables in Burkina Faso, (v) Banana and plantain in Côte d'Ivoire, (vi) Maize in Benin, (vii) Dry cereals (millet and sorghum) in Senegal, (viii) Livestock for meat and dairy in Niger, and (ix) Aquaculture in Nigeria.

These NCoS have benefited from capacity building to have the next generation of Agricultural Scientists, to close the gap in human resources and to ensure continuity of research. In this context, 1021 young scientists were trained in Masters (657 including 169 women) and PhD (364 including 104 women) in various fields related to priority agricultural value chains.

To upscale these achievements, CORAF intends to facilitate and boost intra and inter mobility of researchers and technologies that transcend institutional and national boundaries for an optimization of research outputs of NARS and CGIARS in the National Agricultural Investment Programs. The vision of CORAF for the coming years is to train the new generation of scientists and leaders with the knowledge and skills to replace those about to retire, and spur the agricultural growth needed to reduce poverty in West Africa.

WAAPP Success Stories

Enhanced Productivity of Crops and Tubers to reduce yield gap and climate shocks

WAAPP has introduced 5 improved Nerica rice and 7 upland rice varieties which yields 2 to 3 times higher than non-certified varieties (up to 10 tons/ha for NERICA varieties and 3t / ha for upland varieties). Mali has significantly reduced its dependency on imports that negatively affect its trade balance with a record production of 2.451 million tons of rice for the 2015/2016 planting season. Thanks to WAAPP, Mali has become the second West African rice producer behind Nigeria.

In Senegal, 14 high-yielding, early-maturing and drought-resistant varieties of dry cereals such as sorghum and millet have been developed and distributed to over 500,000 farmers. The new varieties also have the potential to produce between 1.5 to 3 tons per hectare. This is a significant increase when compared to the 0,5 to 1 ton per hectare that local, non-certified varieties typically yield. This allowed smallholder farmers to cope with erratic rainfall and build resilience to climate shocks.

In Côte d'Ivoire, from September 2011 to May 2015, WAAPP has improved the livelihoods of 800,000 beneficiaries, of which 49% are women. 254,000 hectares are cultivated with certified crops of rice, corn and sorghum as well as plantains and yams. According to a study conducted by the National Applied Statistics Institute (EN-SEA), farmers' income has been increased by 22% as result of WAAPP support.



Off-Season Production for Increased Income of Farmers in Côte d'Ivoire

To ensure production of tomatoes during the rainy season and avoid massive infestations of parasites, WAAPP has developed 3 varieties that are resistant to a wide range of common diseases that affect crops during periods of high humidity. Tomato production during the rainy season provides substantial economic benefits for producers who can earn up to US \$ 2 per kilo compared to US\$ 0.5 during the dry season.

In Côte d'Ivoire, Mali, Gambia and Benin, the production of off-season plantain has been adopted by producers and help prevent shortage of plantain on the market from April to September every year. Three short cycle varieties of plantain, resistant to leaf spot disease, coupled with efficient irrigation system have been made available to farmers. This enable them to produce over 30 tons/ha meet market demand all over the year and consequently increase fourfold their income.

Furthermore, WAAPP has introduced the technology on plantain plant derived from stem fragmentation (PIF) that induces mass production of healthy material off farm in 3 or 4 months and all times of the year with an average of over 200 seedlings. For example, a surface of 200 m² can produce between 30,000 and 100,000 plants per year and requires a relatively small investment of maximum US \$ 800. The PIF technology is a real alternative to the in vitro culture, which is more expensive and inaccessible to small producers.



Optimizing Production through Improved Animal Breeds and Feeding Techniques

The technique of all male tilapia production has been developed as the hybrid tilapias have higher survival rate, are well adaptable to local environments.

Also, balanced fish rations using mainly sorghum, groundnut cake, flour, maize, cassava have helped to achieve optimal growth and improved the nutritional quality of fish. These improved rations provide between 30% and 50% of the catfish nutrient needs and reduce the cost of production.



Nutrient Enrichment in Food Processing to Improve Health and Nutrition

To add value to local crops across West Africa, WAAPP initiated a new processing technique on the incorporation of locally produced cereal flour and starches in the process of bread making and pastries. The technology aims to substitute a percentage of at least 15% of wheat flour by the local flour such as cassava, maize, sorghum, millet, and plantain through an improved manufacturing process.

This technique has been disseminated across the region. To date in Senegal, 200 bakeries use 15% local cereal flour in the manufacture of bread and 50% of the flour is also used for the production of pastries. In Côte d'Ivoire, WAAPP in collaboration with the Union of Bakery Owners has supported over 50 bakeries and pastries in the use of composite breads in Abidjan, Bouaké and Korhogo.

This processing technique has significantly boost the local cereals transformation industry in Benin. The composite bread of maize and wheat flour called "gambari lifin" has been adopted by over 150 bakers across the country and create avenues for high income generation.



Improved Post-harvest to Avoid Food Losses

WAAPP has promoted improved Mango Drying Processing technique. It is a simple and low-cost process which adds value to mango, and allows the shelf life to be expanded. No additives or preservatives are added to mango snacks. Producers were empowered to meet international standards and export their products overseas. Over 2,000 jobs have been created in the mango processing industry in Burkina Faso.

This new technique has been disseminated in Côte d'Ivoire where 3 mango drying processing units have been established. With a production capacity of 15 tons of drying mango per day, each processing unit has supplied the market with over 1,000 tons in 2016.

In the rice production industry, improved parboiling techniques and machinery have been introduced by WAAPP through a set of post-harvest techniques and kits on transforming paddy rice into parboiled rice before husking. The improved technique of parboiling rice is gender sensitive and eco-friendly as it is less labor intensive for women, uses less water, less wood, user friendly. The advanced steaming techniques also allows vitamins and minerals such as Vitamin B, potassium, iron, phosphorus, magnesium to penetrate the grain during the steaming process.

WAAPP Guinea has also linked farmers-based organizations to the World Food Programme which has contracted local women cooperatives to supply over 250 tons of parboiled rice within its school feeding program.



Mechanization of Sowing and Harvesting Operations to Avoid Drudgery.

To meet the smallholder farm sector demand for mechanization, WAAPP supported the development of machines to facilitate sowing and harvesting operations. Among these is the Rice drum seeder developed in Mali. The rice seeder allows a 50% reduction in the number of seeds per hectare. Although the tests are still ongoing, it has been noted that the new seeder has a huge potential in terms of rice production. This technology has been disseminated across the country and beyond. Irrigated rice producers from the Office du Niger have been supplied with over 100 prototypes of the Drum Seeder. For the upcoming year, Mali is envisioning to mobilize through WAAPP, US\$ 75,000 to locally fabricate 300 prototypes to meet farmers' demand.

In Ghana, WAAPP has supported the development of a cassava harvester. The goal for developing this machine was to reduce the drudgery of women farmers whose tasks include harvesting and processing of cassava. Five (5) prototypes are developed and have been tested in 90 farms across the country, and it shows great potential in changing the status quo on cassava production. The harvester allows the use of less seeds per hectare (25 kg compared to 60 kg by hand transplantation), reduces the cost of production with a yield of 6.5 to 7 tons per hectare. After immediate harvesting, the field is ploughed and the farmer can just harrow and plant while manual cassava harvesting takes 44-74 days/ha.



2.3 The West Africa Seed Program : Spurring seed system growth in West Africa

Knowing the complexity of ensuring an adequate supply of quality seeds to farmers in the region, ECOWAS designated CORAF as its technical arm to implement the West Africa Seed Program (WASP). WASP is currently being funded by the USAID/West Africa Mission, and by WAAPP supported by the World Bank. At the regional level, the program is piloted through a consortium comprising ECOWAS, UEMOA, CILSS, Hub-Rural, the NARIs, CGIAR centers (IITA, ICRISAT, AfricaRice, and AVRDC), AFSTA, ROPPA, Syngenta Foundation, FAO, AGRA, and AfricaSeeds.

The WASP objective is to increase the supply of quality seeds with particular emphasis on cereals from 12% in 2012, to 25% in 2017. From 2015 to 2016, the CORAF-led program has recorded stellar achievements such as the exponential increase of production and supply of breeder seeds of climate-smart new genetic material, the enhanced capacity of the Private sector to deliver quality foundation and certified seeds, and the development of the first regional Plant Variety Catalogue. Leveraging on the Regional Harmonized Seed Regulation, CORAF has fast-tracked the recovery in Liberia, Sierra Leone and Guinea for the Post-Ebola Agricultural Rehabilitation Programs that has helped to provide food for 2 million farm families.

2.3.1 The Alliance for Seed Industry in West Africa (ASIWA): a convening point for stakeholders in seed sector

In August 2015 in Côte d'Ivoire, CORAF launched the Alliance for Seed Industry in West Africa (ASIWA) for effective coordination to share experiences, pool resources and develop synergies in promoting the use of quality seed in the sub-region.

Prior to the launching of ASIWA, CORAF held consultative processes at regional and national level in nine countries to facilitate the understanding and buy-in of the Alliance by stakeholders. As a demonstration of ownership of the Alliance, 25 national, regional and international organizations have signed the commitment declaration to engage in ASIWA activities.

2.3.2 WASIX: A forecasting tool to enhance seed information exchange and marketing

In support of ASIWA, CORAF developed a seed market information system (MIS) called "West Africa Seeds Information Exchange" (WASIX). It is accessible online by the link; www.wasix.net and serves as the clearing house for information and analysis related to seed sector development and a community of practice to facilitate exchange of ideas, experience, best practices between stakeholders.

Since WASIX creation in 2015, CORAF was able to aggregate seeds supply and demand information across markets and analyses on seed market trends to effectively inform ECOWAS policy analysis, options and advocacy. Currently, 1,445 private sector seed enterprises from 13 WAAPP countries in West Africa have registered their seeds.

2.3.3 Facilitating the Regional Harmonized Seed Regulation in West Africa

In view of the critical role that quality seeds play in improving agricultural productivity, ECOWAS, UEMOA and CILSS initiated a process of inclusive sub-regional consultations. This process was concluded with the adoption of the "Regional Seed Regulation" on 'Harmonization of Rules Governing Quality Control, Certification, and Marketing of Plant Seeds & Seedlings in the ECOWAS-UEMOA-CILSS region.

CORAF marked a significant milestone to boost the implementation of the ECOWAS Regulation by successfully launching the Regional Committee (WASC/COASem-CRSU) which held two statutory meetings in 2015 and 2016. This is expected to further open the seed market, attract more investment and accelerate the production, marketing and use of quality seeds to improve agricultural productivity in the ECOWAS-UEMOA-CILSS region.



Through the intervention of CORAF and partners, the countries have been assisted to implement the Regional Regulation using a more harmonized approach, which has resulted in a remarkable increase in implementation from 41% to 84% between 2013 and 2016 in West Africa, Mauritania and Chad. By 2016, the publication of the ECOWAS Seed Regulation in the national official gazettes stood at 12 out of 17 countries from the ECOWAS-UEMOA-CILSS region.

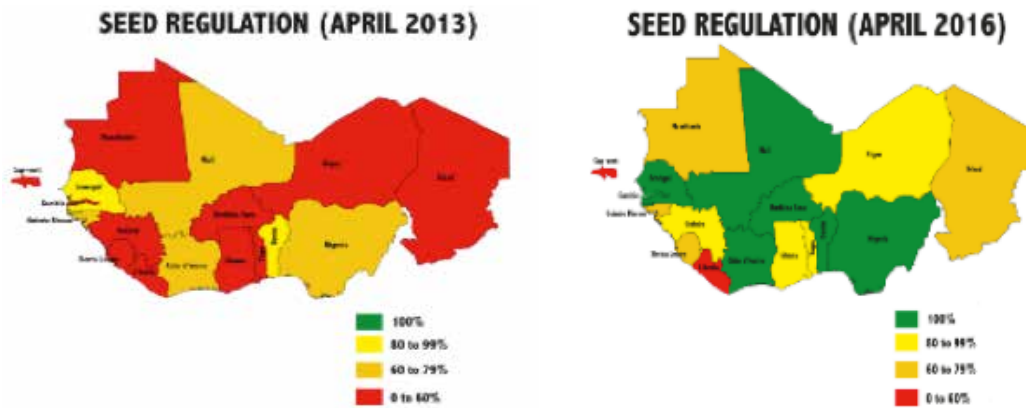


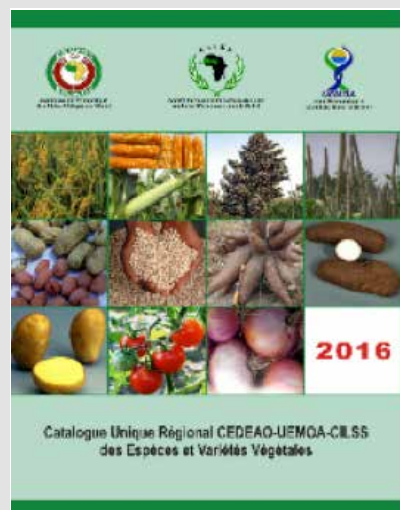
Figure 2: Progress in the implementation of the Regional Seed Regulation

To bridge the gap between Member States regulatory frameworks, a Seed Policy Task Force has been put in place to conduct consultations and lobbying to fast track national seed policy reforms as requested by the Community Regulation for its effective implementation. Therefore, capacities of 1,128 National Seed Regulators were strengthened in Variety Release, Seed Quality Control and Certification, and Phytosanitary Certification. These trainings provided clear approach to properly implement the provisions of the ECOWAS Executive Regulations and Procedures Manuals.

Box 4: The first West Africa Plant Variety Catalogue

In 2016, CORAF released the first West Africa Plant Variety Catalogue. Overall, 1,330 (76%) of the crop varieties of 11 species released in the 17 ECOWAS-UEMOA-CILSS Member States have been registered in the catalogue. This marks a great milestone in the region in making new and productive genetic material available to seed enterprises and farmers in the region.

The catalogue is also important to facilitate seed trade in the region, through providing information on the varieties released in the countries.



2.3.4 Boosting regional supply and demand on quality seed

WASP is estimated to have increased certified seed production in West Africa by more than 300,000 tons which has directly benefited to more than 30 million farmers, processors and small businesses, 45% of whom are women. From 2013 to 2016, the rate of seed supply outstripped the rate of increase in seed demand, thanks to the intervention of CORAF and its partners (IITA, AfricaRice).

WASP has contributed to 34% of breeder seeds produced yearly in West Africa. This positive trend is a clear indication that farmers are increasingly getting access to more quality, high nutritional certified seeds at a fast rate as these improved crop varieties released are climate-smart, tolerant to stresses such as drought, extreme temperatures, iron toxicity, or striga.

2.3.5 Empowered private sector for seed industry development

WASP made laudable achievements by increasing public-private partnerships. The program supported 1,127 SMEs as key force by developing their capacity to produce more and better seeds, facilitate their access to finance and provide business development support (BDS) in the transformation of the seed business from informal to formal sector;

The period 2015-2016 was considered as a booming period in the regional seed sector development with fast growing job creation and an increasingly flourishing seed business. Through the Public-Private-Partnership, the private sector has gained access to over 200 tons of breeder seeds representing 35-37% of regional supply, under WASP, which in turn have been multiplied into 4,000 tons of foundation seeds and 100,000 certified seeds per year.

Most importantly, CORAF-led program supported the establishment of the African Seed Trade Association-West Africa (AFSTA-WA) based in Senegal and highly contributed to strengthen the organizational capacity of 7 National Seed Trade Associations (NSTA) and ROPPA in order to help the private sector expands the regional seed market.

2.3.6 CORAF's convening power for quick response to regional food crisis

In support of the economic stabilization programs of Liberia, Sierra Leone and Guinea after the Ebola epidemic, a rapid recovery seed intervention program was initiated by the ECOWAS Commission. The initiative was coordinated by CORAF through the WAAPP and WASP mechanisms in collaboration with AfricaRice, IITA, private sector and other regional and national stakeholders. The major funding was provided by the World Bank.

The spirit of solidarity brought together ECOWAS, the World Bank, USAID, AfricaRice, the private sector, and Ministries of Agriculture from ten countries (Benin, Burkina Faso, Cote D'Ivoire, Ghana, Guinea, Mali, Niger, Nigeria, Senegal and Togo) and led an unprecedented regional effort to mobilize rice, maize and cowpea seeds) for supply to the three countries affected by the Ebola outbreak. The new varieties supplied originated from AfricaRice and IITA, and are climate-smart, resistant to stresses and diseases, with over threefold yielding capacity compared to older varieties.

About 13,000 tons of certified seed were mobilized and distributed to over 500,000 farmers for direct planting during the 2015-2016 cropping season. In turn, over 250,000 tons of grains were produced, which helped to alleviate the anticipated famine during and after the epidemic.



Seed of hope: Voice of beneficiary farmers from Guinea, Liberia and Sierra Leone

What they said:

Mariama Siré SOUMAH CAMARA,
President of the Women Cooperative
of Walifang-Coyah in Guinea



«Without the seed support we, women's farmers group, wouldn't be able to resume our agricultural activities after the Ebola outbreak. Because we lost many members of our cooperative and family members as well as close relatives which has break up the group dynamic as everyone was afraid and our village has been put into compulsory quarantine. The supply of the seed from CORAF has restored our trust and helped rekindled the group solidarity and provide food for our families.»

Seed of hope: Voice of beneficiary farmers from Guinea, Liberia and Sierra Leone

What they said:

Rougiatou TOURE,
President of the Women Cooperative of Lanfema
Forécariah in Guinea



«Before the outbreak of Ebola, we were facing already facing many challenges regarding food security and the disease came to compound our difficulties. We are very grateful for the donation of Maize and Rice seeds, the inputs and small farming tools which have enable us to give a new life to our activities. We are very pleased with the support we have received and thank all the program partners.»

Seed of hope: Voice of beneficiary farmers from Guinea, Liberia and Sierra Leone

What they said:

Jefferson N. TOKPAH,
President of Manumuin Liberia



«As our area was among the most affected by the Ebola outbreak in Liberia, we very grateful to CORAF, the Liberian government and AfricaRice for avoiding food shortage and the famine in our households. We have been provided with foundation seed of rice and strengthened our capacity in seed production. Our members have been empowered to become fully fledged seed producers.»

Seed of hope: Voice of beneficiary farmers from Guinea, Liberia and Sierra Leone

What they said:

Yaboubossseh KANU,
President of Producers Cooperatives in
Nemunupthene, Sierra Leone



«Our cooperative of about 150 members, has suffered the loss of 15 victims. The restrictions imposed by the authorities, forced us to leave on our seed stocks. But thanks to the seed distributed by the WASP, our communities has been tilling 75 hectares of land as we received 60 Kg of rice seed and revive our agricultural activities.»

Box 5: Women's proactive response to regional food crises

WASP is making news and setting the pace on gender issues in seed systems within the seven focal countries.

- WASP-Mali in partnership with the National Committee of Agricultural Research and the Seed Association has been recognized on addressing the gender disparity in seed systems.
- In 2015, nine women groups with 25 members each from the seven target countries benefited from various capacity building activities in seed production, policy, quality control and seed business plan development.
- In response to the Ebola Outbreak, the female groups such as Women Entrepreneurs in Seed Farm in Niger, FASOKABA from Mali and TechniSeeds from Nigeria supplied 219 tons of foundation and certified seeds of rice, cowpea and maize to Liberia, Sierra Leone and the Gambia.

During the period under reporting, a video documentary and a monograph entitled: "The road to recovery: Experiences of Liberia, Sierra Leone and Guinea after Ebola" were developed to capture the operations, successes and challenges of the Post Ebola Seed Support Initiative. These documentaries highlighted the socio-economic losses resulting from the Ebola epidemic, the timely intervention, the impact and challenges.

2.4 Grooming the Next Generation of Agripreneurs in West Africa and Central Africa

Addressing the issue of youth employment is paramount to countries in the West and Central African sub region. Youth involvement and empowerment in gainful and attractive agribusiness is one of the key priorities of the OP2 of CORAF. As a result, CORAF initiated the project «Empowering Youth for Agripreneurship in West Africa» through WAAPP and the financial support of the Islamic Development Bank (IsDB).

The program has delivered outstanding results and was awarded as one of the top 10 projects of the 2016 Islamic Development Bank Group Innovation Competition, in the Innovative Projects Category, out of 180 applications. The project was recognized for its innovative approach in addressing youth unemployment using ICT tools and web channels to foster adoption of new agricultural technologies, alleviating poverty and promoting economic integration.

2.4.1 Re-ignite the spark in agriculture through mentoring and capacity building

The success of the pilot phase paved the way to an extended project in 2015 titled "Empowering Youths for Agri-preneurships in West Africa". This resulted in empowering over 250 youth through capacity building by enhancing networking, mentoring, and virtual learning by showcasing youth agribusiness model farmers, best practices in farming, and agricultural technologies and innovations.

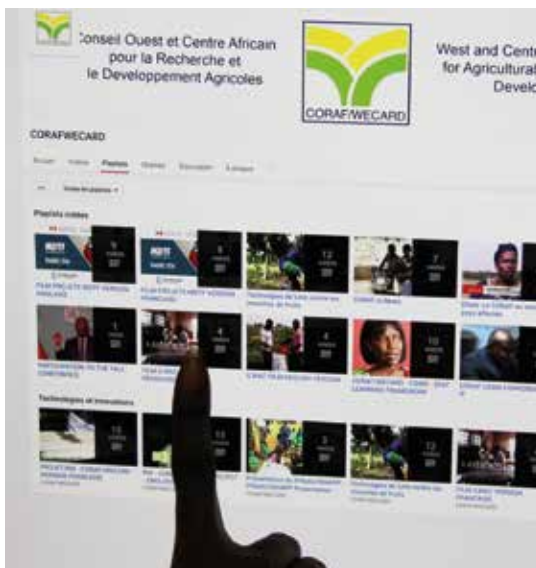
From an initial pool of 3,254 mentee applications across the West African region, four batch of 120 mentees (500 in total) were selected to be paired and matched with imminent scientists and researchers on agricultural technologies generated under WAAPP as well as successful entrepreneurs from the private sector for a web-based mentoring process.

2.4.2 Harnessing the potential of web channels and ICT to attract youth in agribusiness

In 2014, CORAF mobilized seed funds from the IsDB towards putting technologies developed by WAAPP to effective use by young farmers through the project «Support to the launching of knowledge for youth employment through the Web Channel.» As part of the project achievements, 15 documentary films were produced by CORAF (in French and English) on high-yielding and cost-effective technologies generated by the NCoS. These documentaries are made available to youths through the Youtube Channel (<https://www.youtube.com/user/CORAFWECARD>) and social networks of CORAF (Facebook: facebook.com/CorafWecard/ and Twitter: https://twitter.com/CORAF_WECARD). As of December 2016, these videos have recorded a total number of 246,870 views on the Youtube channel.

The CORAF model for Youth Agripreneurships has triggered interesting results with a greater interest among youth, which led to the improvement of the model and also to options for scaling up and out with the launching of the CORAF WebTV on Youth Agripreneurship.

2.4.3 Seeing is believing: A WebTv on Youth Agripreneurship



www.coraf-youthshub.com/webtv

CORAF has officially launched a WebTv on youth Agripreneurship, to use videos and live streaming web channel as a strong tool to restore the image of agriculture and for technology transfer and adoption by bridging the gap between theory and practice. It will show-case youth agribusiness models, disseminate high impact agricultural technologies and innovations and success stories to empower Agripreneurships in West and Central Africa.

The WebTv will also offer live and interactive online debates on critical issues regarding opportunities for youth employment in agriculture. So far, the WebTv have recorded.

2.4.4 Prêcher la bonne nouvelle de l'agriculture aux jeunes à travers l'Afrique de l'Ouest

CORAF has initiated a series of meetings to preach the good news on agribusiness development through a comprehensive outreach effort by providing a menu of proven technologies with clear socio-economic benefits and agribusiness information and opportunities to at least 1,000 young people across West and Central Africa.

CORAF has participated in the 2nd annual West Africa Regional Conference of the Mandela Washington Fellowship (MWF), the flagship program of President Barack Obama's Young African Leaders Initiative (YALI), from May 19-21, 2016 in Accra Ghana. The opportunity was used to present its major achievements regarding the development of viable mechanisms/models to engage youth in agribusiness in West and Central Africa.

On June 29, 2016 the regional coordinator of WAAPP, Dr Niéyidouba LAMIEN and the focal point of the project, Lola AKOMATSRI, met the first cohort of the Young African Leaders Initiative (YALI, an initiative of the former US President Barack Obama) Regional Center West Africa based in Dakar- Senegal. The team presented business opportunities offered by technologies and innovations generated by WAAPP and raise awareness on the importance of engaging youth in agribusiness. The session was attended by 84 young leaders engaged in agribusiness in West Africa.



2.5 CORAF – UEMOA Convention on Implementing Priority Research Programs on Maize, Cotton and Livestock

CORAF and the West African Economic and Monetary Union (UEMOA) have a convention for the implementation of a three-year (2014-2016) collaborative program for the promotion of sustainable agriculture and the implementation of the Union's Agricultural Policy. The aim of the Convention is to ensure sustained production and a steady and abundant supply of quality agricultural products to the UEMOA market.

2.5.1 Improving the performance and competitiveness of the maize value chain

In order to strengthen the competitiveness of the commodity, CORAF proposed an innovative financing models for maize based on analyses the organization of the value chain and the existing funding mechanisms in the UEMOA countries including Benin, Burkina Faso, Côte d'Ivoire, Mali, Senegal and Togo, where maize occupies a strategic position in the development of the agricultural sector. Financing models for each of the segments (production, processing, and marketing) of the sector have been developed. The outcomes of analyses have also contributed to elaborate a policy brief in order to inform policy formulation as well as pointing towards key areas that need further research attention and to provide alternative options on sustainable funding mechanisms of the maize value chain in the UEMOA Zone.

2.5.2 Improving the performance and competitiveness of the cotton sector

The Valorization of Cotton Stalks for Particle Board (VATICOPP) project should contribute to the increase of income of producers through cotton by-products. Rather than burning as usual, this valorization of cotton stalks to produce particle board will enable processing industries to be integrated into the cotton value chain in Benin, Mali and Togo.

To facilitate the transfer of technologies for the manufacture of particle board based on cotton stalks, three innovation platforms have been set up in beneficiary countries comprising more than 100 members from the cotton value chain. In addition, 337 cotton growers, of which 16% were women and 28 technicians/extension workers, were trained on good practices for collecting and conserving cotton stalks for use in the production of particle board.

2.5.3 Improving the performance and competitiveness of livestock / meat, poultry and aquaculture sectors

The project « **Valorization of local Animal and Aquaculture genetic resources in the UEMOA zone, acronym PROGEVAL** » is a game changer in the sustainable valuation of local animal genetic resources (Zebu cattle, taurin Ndama, sheep, guinea fowl) and aquaculture (Tilapia and catfish) in the UEMOA area to ensure food security and increase the income for producers in Burkina Faso, Côte d'Ivoire, Guinea Bissau, Niger and Senegal. Six (6) innovation platforms on management of Animal genetic resource and Aquaculture were established in Côte d'Ivoire, Niger, Guinea, Burkina Faso and Senegal.

2.6 Capacity for Agricultural Research for Development (C4R4D) in West and Central Africa

The Capacity for Agricultural Research for Development (C4R4D) is a response to the challenge of developing research capacity in West and Central Africa (WCA) started on January 12th, 2015 and will end on July 12th, 2018. The C4R4D project is funded by IDRC, managed by CORAF and implemented in association with IITA in four countries namely Chad, Democratic Republic of Congo, Sierra Leone and Togo. The Project purpose is to improve the institutional capacity of NARS in the targeted countries through the increased number and quality of qualified agricultural science graduates in AR4D capable of identifying, generating and disseminating research outputs that meet the needs of smallholder farmers and other actors in the food chains.

2.6.1 Selection of MSc and PhD students

Interaction with the Director Generals of the National Research Institutes: After approval of the project by IDRC and finalization of the implementation modalities, notifications were sent to the Director Generals of the Research Institutions of the target countries to inform them of the availability and conditions of the research grants.

Dissemination of the announcement of the research grants: Advertisements were issued in the form of an open call for proposals prepared and circulated through various channels including the email addresses of the national research institutes and universities, and IITA and CORAF websites.

Recruitment of students: A total number of 28 students of which eight are MSc students and 20 PhD students were recruited in the four countries.

2.6.2 Capacity Development of Students

Four training workshops were organized from June to July 2016 for 18 students including 7 women in Scientific writing for agricultural research, Research methodology, Data management and Pedagogy for agricultural research. These trainings allowed students to: (i) be equipped with the tools to enable them to write and present well-argued and documented scientific work that can be acceptable for theses and peer-reviewed publications and whose results are easy to comprehend and use by other stakeholders; (ii) design and implement universally surveys and concepts and convert data into various formats using appropriate softwares; and (iii) be equipped with the tools to enable them to teach and conduct training upon the conclusion of their MSc and PhD programs.

Mainstreaming of gender in the project: Among the 28 students, 12 or 43% are female. This will encourage young female to undertake tertiary education especially at MSc and PhD levels. At scale, this will result in a better representation of women scientists in AR4D. The pilot project is contributing to science through delivery of technologies, scientific papers and publications. It is expected to generate a model of support to students who are embarked in the tertiary education without any support or scholarships.

2.7 Support to the Regional Plan for Control and Management of Fruit Flies in West Africa : Mangoes free from Flies for increased Export

Implemented since February 2015, the "Support project to the regional plan for control and management of fruit flies in West Africa (PLMF)" was initiated by ECOWAS and UEMOA and funded by EU, the French Agency for Development (AFD) and ECOWAS participating countries. CORAF coordinates the "Applied Research Component" which focuses on existing research and development programs for improved surveillance and control technologies

2.7.1 Better understanding of fruit pest's biology and behavior

CORAF has successfully coordinated an extensive research to provide deep understanding of the biology and behavior of fruit flies and the best ways to control them. A total of 13 species of fruit flies were identified as the most damageable to tree fruits in the ECOWAS zone with a predominance of *Bactrocera dorsalis*. This specific specie, causes extensive economic losses to horticultural crops throughout West Africa and is especially harmful to the mango value chain in due to its high reproductive rate.

2.7.2 Integrated Pest Management approach to create a fruit fly-free zone

The research team developed a wide range of control measures to keep damage below an economic threshold. A Strategy on Integrated Pest Management (IPM) was developed. An integrated approach combining three technologies: orchards of GF-120, a commercial food baits and traps based on Timaye yielded interesting results in Benin and Burkina Faso, with about 80% decreased in infestation. For early detection of new fruit fly pests and hotspots, a combination of techniques has been used including Para pheromones, local and commercial food baits and natural plants. Experiments with Methyl eugenol have been conclusive on sterilizing male pests and their annihilation to guarantee eradication. The Biological control techniques using parasitoids, predators or pathogens were also demonstrated. Among the parasitoid species, *Fopius arisanus* was recognized as a natural enemy of fruit flies that can be used in the conditions of West Africa. The use of weaver ants as predators are also promising as they considerably reduce the number of fruits damaged by deterring fruit flies.



Demonstration of the technique on the use of food baits as a spot spray or in bait station to kill fruit flies.



Technology on the promotion of weaver ants in orchards against fruit flies.

2.8 AfricalInteract : Enabling research-to-policy dialogue to adaptation to climate change in Africa

AfricalInteract, a platform enabling research-to-policy dialogue for adaptation to climate change was funded by IDRC and coordinated by CORAF under the auspices of FARA from 2011 to 2015. The overall objective of AfricalInteract was to develop a platform for the effective and efficient transfer of information to policy makers, with the ultimate aim of enhancing the resilience of vulnerable populations in Africa.

The project was backstop in each African region by a strategic Regional Task Force comprising of Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), (Commission des Forêts d'Afrique Centrale (COMIFAC), Energie-Environnement-Développement (ENDA), and Food and Natural Resources Policy Analysis Network (FANRPAN).

2.8.1 Strengthened scientific evidence base for adaptation to climate change

The AfricalInteract has produced a synthesis of research on climate change adaptation in three key sectors namely agriculture, health and urban with water and gender as cross cutting issues. The synthesis documents have identified more than 50 relevant issues related to climate change adaptation in the four targeted regions of sub Saharan Africa. It also pointed out key gaps in both research and policy as far as climate change adaptation is concerned. These reviews are a useful tool for scientists and students in providing required scientific information and supporting literature reviews for papers on climate change adaptation.

2.8.2 Fostered integration of climate change into development policies, strategies, programs, and projects at continental level

AfricalInteract in collaboration with FARA and the Focal organizations ASARECA, COMIFAC, Enda-energie, FANRPAN and forged a collaboration framework within and across regions in Africa to enhance informed decision-making for adaptation to climate change in Africa and shared valuable information and knowledge on climate change adaptation and enhanced understanding of evidence-based CSA policy and programme design. Participants deliberated on how informed decision-making could contribute towards the goal of the African Climate Smart Agriculture Alliance (ACSAA) to scale-out CSA among 6 million smallholder farmers in Africa.

Furthermore, a total of 1,274 policy makers including parliamentarians were sensitized on climate change during the initial launching workshops in the respective regions and in-person meetings with key parliamentarians of the ECOWAS parliament in a bid to engage the Regional Economic Communities. Such knowledge and increased awareness is helping parliamentarians to vote for increased allocation of budget to climate change initiatives in their respective countries.



CORAF present at the COP 21 - Paris (2015)

2.8.3 The African Group of Experts (AGNES): A coalition of African scientists to provide scientific support to Climate Negotiations

In 2015, AfricalInteract was one of the pioneer bodies in collaboration with ACPC and CCAFS to foster the formation of the African Group of Experts (AGNES) to support the African Group of Negotiators by providing scientific evidence that will help them in making reasonable and convincing submissions on behalf of Africa in the climate change negotiations.

The initiative enhanced the negotiating capacity of the AGN in making a case for the African continent at the climate change negotiations while at the same time fostered the link between these negotiators and scientists across the continent to sustainably provide much needed backstopping of the AGN with scientific evidence. Increasingly, many AGNES members are being recognized by their country Focal Points. This recognition was climaxed at the CoP 21 where AGNES members in addition to providing scientific backup to the focal points were designated as country representatives and incorporated into special committees of the various United Nation Frameworks Convention on Climate Change (UNFCCC) subsidiary organs like the SBSTA. The initial members of AGNES totaling 19 came from 13 countries with all the regions represented. By the end of the project AGNES had an effective membership of 35 drawn from 19 countries.

2.9 Integrated Land and Water Management for Adaptation to Climate Variability and Change (ILWAC)

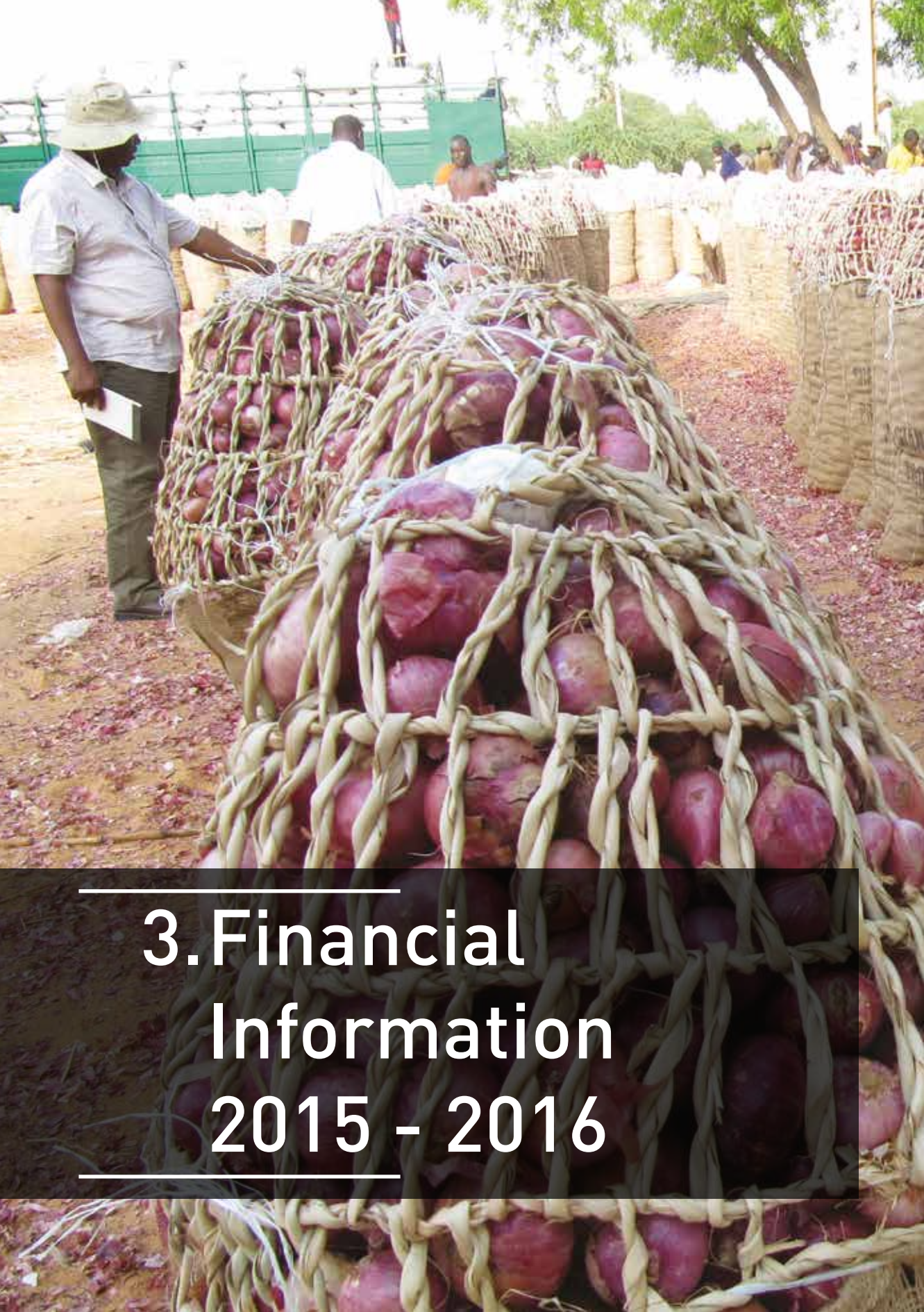
The ILWAC Trust Fund coordinated by CORAF which complements CAADP and TerrAfrica initiatives ended in 2015. It intended to identify innovative approaches for climate-resilient land and water management that could be scaled up under these programs. The development objective of the ILWAC-TF was to improve the ability of African agricultural land and water users to plan and manage climate change adaptation measures. Four regional projects targeted a total of 70,000 beneficiaries in a total of 15 countries in West and Central Africa have been implemented.

The project entitled “Enhancing the resilience and adaptive capacity to climate change through integrated land, water, and nutrient management in semi-arid West Africa” implemented in Mali, Ghana, Senegal, has established a total of 9 innovation platforms for innovations in adaptation to climate change among its membership. Over 2000 farmers accessed technologies like fertilizer micro dose, Assisted Natural Regeneration (ANR), improved varieties of maize and rice as well as management practices in weed control and storage.

Through the “Improving climate resilience of agricultural ecosystems along the watershed by the participatory development of anti-erosion and fertilizer agroforestry systems in six West African countries” - AmREACCAF project, over 150,000 seedlings were distributed in the target project countries (Burkina Faso, Mali, Cote d’Ivoire, Niger, Guinea and Benin. Moreover, 2000 farmers were trained in utilizing simple and affordable anti erosion innovations in the farming systems. A total of 363 ha of land were under improved management either with planted or naturally regenerated trees and erosion control.

Furthermore, nine (9) innovative platforms were successfully established in Nigeria and Côte d'Ivoire to promote appropriate soil-water-nutrient management under the project "Sustainable soil-water-nutrient management under increasing climatic change and variability". A total of 11 check dams were constructed in Nigeria and Côte d'Ivoire. In addition, 28 tube wells were dug and two water pans rehabilitated in Nigeria. Assorted seeds and tools were distributed to communities and benefiting up to 3000 inhabitants. The check dams and tube wells as well as the rehabilitated wells are benefitting over 6000 rural people across the three countries. Overall, the check dams were able to support the cultivation of 50 ha of land mainly by women during the dry season, upland cropping during the rainy season covered more than 200 ha.





3. Financial Information 2015 - 2016

3. Financial Information

3.1. Financial overview

The financial statements highlighted in this report for the 2015 and 2016 financial years are as certified by Mazars Audit Firm.

3.1.1 Operating income

The operating income represents grants from donors that have been allocated to direct costs of research projects and programs, and also to the operating expenses of the Executive Secretariat of CORAF. There is a substantial decrease of 38% between 2015 and 2016 due to several projects that have come to an end.

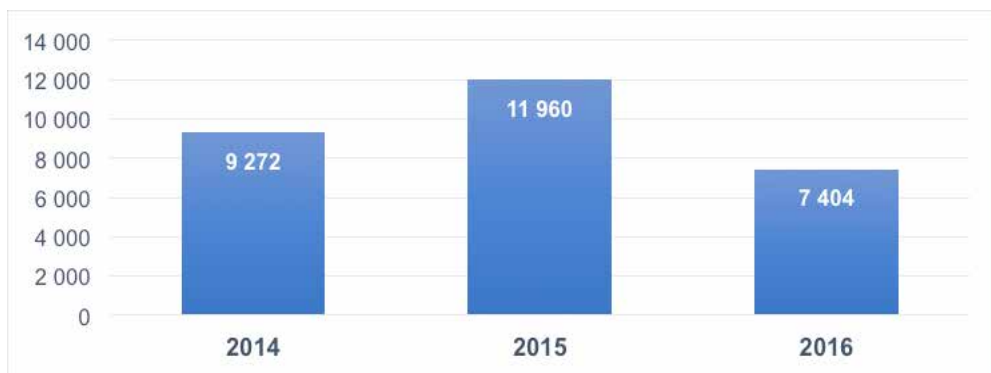


Figure 3 : Trend in the operating grants (amount in Millions FCFA)

3.1.2 Balance sheets by 31 December for 2015 and 2016

The balance sheets have been in decline since 31 December 2014. For years ended 31 December 2015 and 2016 these have decreased from 6 252 to 4 952 Million FCFA. This decline is a result of the closure of several projects.

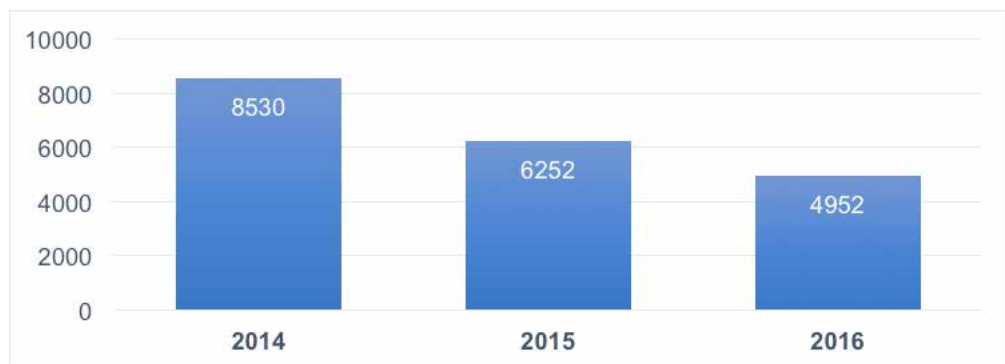


Figure 4 : Trend in financial asset of CORAF/WEECARD (amount in Millions FCFA)

3.2. Resources mobilization and agreements ended in 2015

3.2.1. Resources mobilization

During the period in review, CORAF's efforts were geared toward the implementation of the projects carried forward from OP1 to OP2, the evaluation and preparation of the implementation completion reports of projects coming to their end among which 17 MDTF projects, 4 ILWAC projects, as well as WAAPP 1B and 1C.

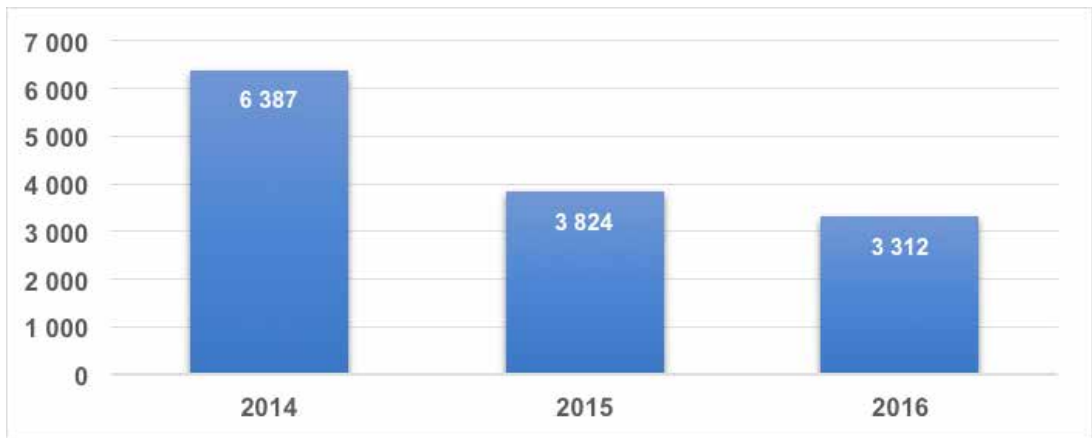


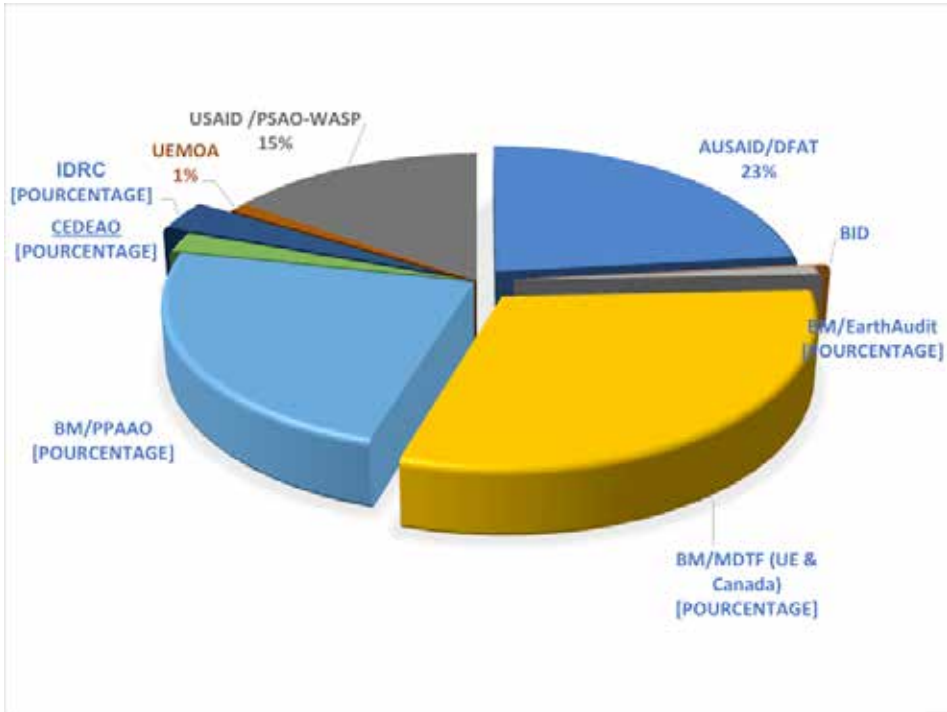
Figure 5: Trend in resource mobilization (amount in Thousand USD)

3.2.2. Agreements Closed in 2016

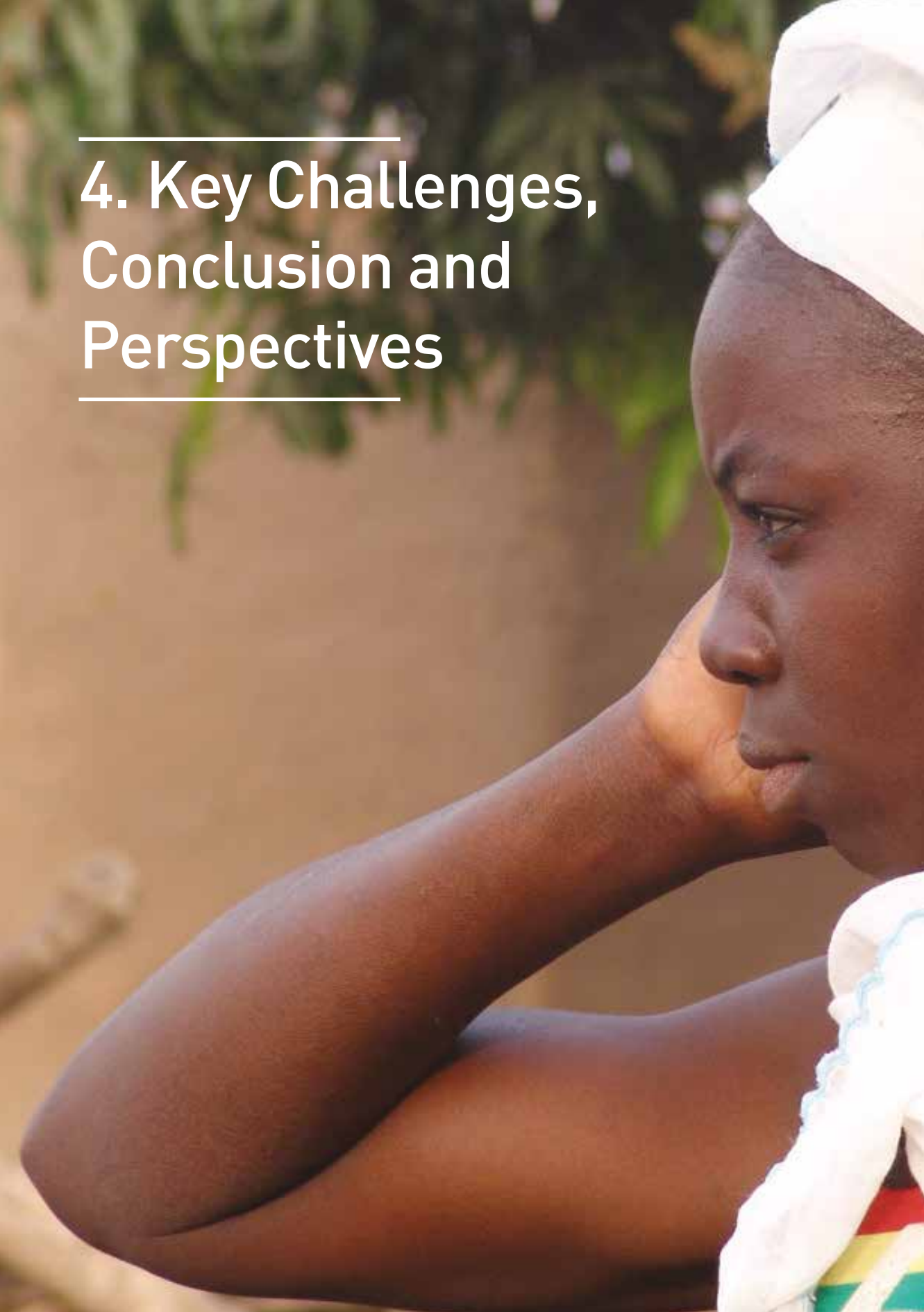
The table below highlights the status of closed agreements:

Donors	Duration (Year)	Amount for Projects (USD)	Amount for Coordination	Starting	Closing
MDTF	5	11 965 905	9 863 609	2011	30/09/2016
WAAPP/WB 1B	5	2 949 554	3 622 169	2011	30/06/2016
WAAPP/WB 1C	5	2 804 552	3 160 932	2011	30/06/2016
EBOLA SEED	1	2 600 000	400 000	2015	31/12/2016
CRDI/DCAR	3	536 064	32 164	2015	18/12/2016
UEMOA	3	2 130 000	870 000	2014	31/12/2016
GC	2	0	120 000	2014	31/08/2016
IsDB	1	60 000	14 000	2016	01/01/2016
FARM/Seed	1	0	29 500	2016	31/12/2016

3.2.3. Our major donors during the 1st Strategic Plan (2007-2016)



4. Key Challenges, Conclusion and Perspectives



4. Key Challenges, Conclusion and Perspectives

4.1. Challenges

This period was marked by changes at the management of the Organization, with the departure of Dr Harold Roy-Macauley from the position of the Executive Director to that of Director General of AfricaRice in March 2015, the return of Dr Paco Sereme as the interim Executive Director of CORAF between March 2015 to April 2016, and the arrival in May 2016 of Dr Abdou Tenkouano as the new Executive Director. With many projects coming to an end (WAAPP B and C, MDTF, DFAT, ILWAC, Africalnteract, etc.), changes were also noted with the departure of the Director of Research and Innovation in July 2016, five out of six Program Managers, and other staff in Communication and Monitoring and Evaluation Units.

CORAF experienced a reduction in the amount of funds received from the World Bank. Fortunately, the extension of MDTF to March 2017 allowed a restructuring and reallocation of available funds to performing projects and to administrative support with a view to facilitating the completion of on-going priority activities, and scaling up results and the achievements of the development objective of the programme.

4.2. Conclusion

The period under review was particular markedly by the study on the institutional and organization audit of CORAF commissioned by the Governing Board and the assumption of duty of the new Executive Director. CORAF pursued the implementation of the 2nd Operational Plan (2014-2018) with relentless efforts in the mobilization of resources through different advocacy missions with technical and scientific partners. CORAF participated in high level consultation meetings and established strategic alliances with key stakeholders in research and agricultural development, both inside and outside of the West and Central Africa region. CORAF advocated with the RECs to strengthen its strategic alliance and partnership as well as with evolving regional organizations operating in agricultural research. It is worth nothing that the ES of CORAF is continuing to ensure regional leadership in improving agriculture research, technology generation, dissemination and adoption, empowerment of actors and knowledge management among its stakeholders.

The implementation of OP2 is, however, on-going with a portfolio of 33 projects enshrined in the Plan and a host of regional studies on strategic issues of food, nutrition security, climate change and adaptation. Progress made by the ES of CORAF during this reporting period is rated as satisfactory based on achievements made on key performance indicators at the CORAF global level. The program department has made considerable progress, especially in the implementation of the projects carried forward from OP1 to OP2. These projects have tested, disseminated technologies and innovations on the IPs that are delivering important development outcomes and impacts on the target groups in WCA. The innovation platform approach has brought together multi-stakeholders to exchange experiences and share lessons learned. The platforms are today considered as a potential impact infrastructure, to enhance the delivery of development outcomes and impact at scale.

4.3. Perspectives

A new era for CORAF under the leadership of a new Executive Director has given a new impetus to the Institution and raised hope and expectations among the staff and partners. A roadmap set by the new administration includes: (i) the institutional development with a new organigram; (ii) updating the Strategic Plan (2007 - 2016) and its addendum to a second Strategic Plan for the period 2017 to 2026, and the refreshing and updating the 2nd OP (2014 -2018) to a third Operational Plan (2017-2021); (iii) a resource mobilization strategy; (iv) the scaling of West Africa Agricultural Transformation program (WAATP) to include Cape Verde and Guinea Bissau : and (iv) increasing CORAF visibility in Central Africa by supporting Cameroon and Chad integration into the WAATP.

CORAF played its role as a key regional player in the process of designing the TAAT, represented the views of the SROs and discussed possibilities of partnerships with World Fish, World Vegetable Centre, ICRISAT, CIMMYT and IITA in implementing assigned activities. There are new expectations in scientific cooperation with partners on the implementation of AfDB initiative on the Africa Agricultural Research Programme (AARP).

Further opportunities lie in the Memorandum of Understanding that CORAF and the International Fertilizer Development Center (IFDC) have signed, aimed at identifying activities to improve agricultural productivity thereby contributing to improving food security and reduce poverty in West and Central Africa.



Annexes

Annex 1 : List of Scientific and Technical Papers Published by CORAF

Scientific articles

1. Geographical assessment of body measures and qualitative type traits in West African Cattles paper submitted to Tropical Animal Health and production;
2. Effet de l'intensité de l'ombrage sur productivité de cacaoyers dans les systèmes agro-forestiers à base de cacaoyers au Cameroun;
3. Biodiversité et stocks de carbone dans les systèmes agro-forestiers à base de cacaoyer (SAF cacao) : cas des localités d'Evoudoula-Okola et Yambassa région du Centre Cameroun;
4. Local knowledge and Effects of associated tree species litter fall on soil health under cocoa systems in the forest zone of Cameroon;
5. Evaluation des performances économiques des ligneux associés dans les systèmes agro-forestiers a base de cacao;
6. Effet de la structure spatiale des agrumes sur la sévérité de trois maladies fongiques (phaeoramulariose, gommose et scab) dans les systèmes agro-forestiers à base de cacaoyers des zones humides du Cameroun;
7. Comparison de deux methods de caractérisation de l'ombrage: Logiciel shade motion et densimeterhemispherique dan un agroforeta base de cacooyer;
8. «Dynamique, diversité végétale et valeurs écologiques des agro-forêts à base de cacaoyers de la Sous-préfecture de Kokoumbo (Centre de la Côte d'Ivoire)»;
9. Omitoyin B.O., Ajani E.K. and Nwanna L.C. ed. (2013): Training Manual for Fish Farmers under integrated fish cum poultry and rice culture. 123pp. Walecrown Ventures Ibadan;
10. Ajani, E. K., Omitoyin, B.O., Akinwole A.O., Fregene, B. T., Adeshinwa A. O. K., Kazeem, K. O., Osho. E. F. and Olojo, B.O.(2014) : Biological Factors And Performance Indicators Under Integration Of Fish, Poultry And Rice Production. Proceeding of the HumboltKellog Conference, Federal University of Technology Akure,Ondo state, Nigeria. Sept 29- Oct., 1, 2014. Pp 13;
11. Fregene, B. T., Ajani, E. K., Omitoyin, B.O., Akinwole A.O., Adeshinwa A. O. K., Kazeem, K. O., Osho. E. F. and Onoda, O. A. (2014): Production indices and profitabilty analysis of integrated fish farming (fish, rice, poultry and pig production). Proceeding of the HumboltKellog Conference, Federal University of Technology Akure,Ondo state, Nigeria. Sept 29- Oct., 1, 2014. Pp 13;
12. The BUN (The University Newsletter), Golden Jubilee of Reunification Edition (March 3014) CORAF/WECARD/WECARD Integrated Aquaculture Projects (Pg 26-31);
13. Oben, B.O., Oben, P., Ajani, E., Omitoyin, B., Anyizi, B., Makombu, J., Tabi, E., Sigalla, E. and Ngyeh, S. (2014). Enhancing Sustainability in Integrated Aquaculture Systems by using biotechnological techniques in Sub-Saharan Africa. World Aquaculture Society : World Aquaculture 2014-Presentation;
14. DRUSSA Platform 2013: Sustainable Integrated Aquaculture. In: Development Research Uptake in Sub-Saharan Africa (DRUSSA), Platform 2013: Getting evidence-based development research into use in Sub-Saharan Africa;
15. Melecony C. Blé, Adja F. Vanga, Pierre J. Assi Kaudhjij, Yao L. Alla1, Adjoua F. Kouassi,

- Kanidana S. Coulibaly³, Mikolasek O. (2015). Environnement socio-économique des exploitants piscicoles du Centre-ouest et du Sud-ouest de la Côte d'Ivoire;
16. Melecony C. Blé, Pierre J. Assi Kaudhjis, Adja F. Vanga, Yao L. Alla¹, Atsé F. Amian, Adjoua F. Kouassi³, Kanidana S. Coulibaly³, Mikolasek O.⁴, Eboua N. Wandan. (2015). Pratiques piscicoles dans le Centre-ouest et du Sud-ouest de la Côte d'Ivoire;
 17. Efole E.T.; Mikolasek O. ; Songmo B. L. ; Ndzana B.E.B.; Nyamsi Tchatcho N. L. ; Blé M.C. ; Tchoumboungang F.; Tomedi Eyango M., 2015. Comment améliorer la production des systèmes piscicoles extensifs via un empoissonnement successif, FT CRO.
 18. Blé M.C.; Efole E.T.; Songmo B. L.; Ndzana B.E.B.; Nyamsi Tchatcho N. L.; Mikolasek O. ; Tchoumboungang F.; Tomedi Eyango M., 2015. « ACADJA » comme système écologique pour améliorer la production des systèmes piscicoles extensifs, FT CRO.
 19. Tomedi Eyango M.; Efole E.T.; Ndzana B.E.B.; Songmo B. L.; Nyamsi Tchatcho N. L.; Blé M.C.; Mikolasek O.; Tchoumboungang F., 2015. Rizipisciculture : voie d'intensification écologique des systèmes piscicoles extensifs, FT CRO.
 20. Mikolasek O. ; Blé M.C. ; Efole E.T.; Tomedi Eyango M., 2015. Comment disposer de manière régulière des juvéniles de tilapias (*Oreochromis niloticus*) pour garantir la mise en charge des étangs de production de poissons marchands ? FT CRO.
 21. Africa Food Security Initiative (AFSI) / Change stories from West and Central Africa – Innovative Platforms – February 2015 CORAF/WEACARD, 42 p.
 22. Book of abstracts of the International Conference on Innovations Systems in West and Central Africa –Senegal/ February 2015, CORAF/WEACARD 91 p.
 23. Book of Abstracts of the Workshop to facilitate the scientific production OF WAAPP National Centres of Specialization (NCoS), Competitive and Commissioned projects- Burkina Faso / March 2015, CORAF/WEACARD 47 p..
 24. Olapade Olufemi Julius, Alimamy Turay, Momoh Rashid Raymond, 2015. Economic Assessment of Integrated Fish Farming (Fish-Rice-Piggery) in Sierra Leone. - (<http://www.sciencepublishinggroup.com/j/aff>)
 25. Kalandi M., Sow A., Guigma H. Bathily A., Sawadogo G.J. (2015). Evaluation de la qualité nutritionnelle du lait cru dans les élevages traditionnels de Koalack au Sénégal Int. J. Biol. Chem. Sci. (Accepté).
 26. Vincent Joseph Mama, George A. Muluh, Harold Roy-Macauley et Paco Sereme Quelle recherche agricole pour dynamiser le secteur agricole en Afrique ?
 27. Naitormmbaide M., Djondang K., Mama V. J. et Koussou M. Criblage de quelques variétés de maïs (Zeamays L.) pour la résistance au *Striga hermonthica* (Del) Benth dans les savanes tchadiennes.
 28. MPanzu Balomba P.: Analyse de la filière Gnetum en RDC : cas de l'approvisionnement de Kinshasa à partir de Kananga
 29. Bwaya BizaBokob'HI: Analyse de la Filière GNETUM en RDC. (cas de l'approvisionnement de Kinshasa à partir de Kananga)
 30. Diambilayi S.: La place des PFNL dans la réglementation forestière congolaise
 31. Mutambwe S.: Fonctionnement des systèmes de commercialisation (distribution) de Gnetum provenant de Kananga à Kinshasa

Reports of studies & synthesis papers

32. CORAF/WECARD, 2015. Etude sur la transhumance transfrontalière et les conflits liés à l'utilisation des ressources naturelles en Afrique de l'Ouest. Rapport final. Dakar, CORAF/WECARD, 109 p.
33. CORAF/WECARD, 2015. Approche multi-acteurs pour une transhumance transfrontalière apaisée en Afrique de l'Ouest. Note aux décideurs. Dakar, CORAF/WECARD, 11p.
34. CORAF/WECARD, 2015. Un Cadre juridique adapté et harmonisé pour une transhumance transfrontalière durable en Afrique de l'Ouest. Note aux décideurs. Dakar, CORAF/WECARD, 12 p.
35. Sawadogo G.J., Ouédraogo A.G., Marichatou H., Kagoné H., Sow A., Dieng K., Millogo V. (2015). Plateforme d'Innovation Multi acteurs de la Filière Lait Local de la Région de Kaolack (PA-FILKA) au Sénégal : mise en place, réalisations. Conférence Internationale sur les systèmes d'innovation en Afrique de l'Ouest et du Centre, 25-27 Février 2015, Saly-Portudal, Sénégal
36. Olapade and all., 2015. Training Manual on Integrated Aquaculture farming system (Fish, rice and pig) produced and disseminated; this Manual includes all the innovations demonstrated by the project along the fish value chain. Njala University.
37. Rhodes, E.R., Jalloh, A. and Diouf, A. (2014) Review of Research and Policy for Climate Change Adaptation in the Agriculture Sector in West Africa - SUMMARY.
38. Doumbia, S., Jalloh, A. and Diouf, A. (2014) Review of Research and Policy for Climate Change Adaptation in the health Sector in West Africa - SUMMARY.
39. Sanni, M., Jalloh, A. and Diouf, A. (2014) Review of Research and Policy for Climate Change Adaptation in urban areas in West Africa - SUMMARY.
40. Sogoba, N., Jalloh, A. and Ndjatsana, M. (2014) Review of Research and Policy for Climate Change Adaptation in the health Sector in Central Africa - SUMMARY.
41. Wouapi, N., Jalloh, A. and Ndjatsana, M. (2014) Review of Research and Policy for Climate Change Adaptation in Urban Areas in Central Africa - SUMMARY.
42. Ngeve, J.M., Jalloh, A. and Ndjatsana, M. (2014) Review of Research and Policy for Climate Change Adaptation in the Agriculture Sector in Central Africa - SUMMARY.
43. Amis, M., Jalloh, A. and Hachigonta, S. (2014) Review of Research and Policy for Climate Change Adaptation in the health Sector in Southern Africa - SUMMARY.
44. Mapfumo, P., Jalloh, A. and Hachigonta, S. (2014) Review of Research and Policy for Climate Change Adaptation in the Agriculture Sector in Southern Africa - SUMMARY.
45. Joshua, M., Jalloh, A. and Hachigonta, S. (2014) Review of Research and Policy for Climate Change Adaptation in Urban Areas in Southern Africa - SUMMARY.
46. Githeko, A., Jalloh, A. and Mogaka, H. (2014) Review of Research and Policy for Climate Change Adaptation in the health Sector in East Africa - SUMMARY.
47. Liwenga, E., Jalloh, A. and Mogaka, H. (2014) Review of Research and Policy for Climate Change Adaptation in the Agriculture Sector in East Africa - SUMMARY.
48. Mubaya, C.P., Jalloh, A. and Mogaka, H. (2014) Review of Research and Policy for Climate Change Adaptation in Urban Areas in East Africa - SUMMARY.
49. Traditional Vegetables Recipes from Cameroon: Amaranth, African Eggplant, Jute Mallow, Nightshade and Okra. 2014. Takemore Chagomoka Regine Kamga, Abdou Tenkouano and Maureen Mecozzi.

50. Regional Cassava Value Chains Analysis in West Africa: Cases study of Sierra-Leone, Liberia, Ghana, Nigeria and Cote d'Ivoire. Working Paper. September 2014. West and Central African Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Senegal
51. Regional Rice Value Chains Analysis in West Africa: Cases study of Sierra-Leone, Liberia, Mali, Guinea and Cote d'Ivoire. Working Paper. September 2014. West and Central African Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Senegal
52. Etude régionale sur la commercialisation de la banane plantain en Afrique de l'Ouest : Document de travail. Janvier 2014. West and Central African Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Sénégal
53. An assessment of the critical human, financial and institutional capacity issues affecting research and development in Benin, Burkina Faso, Ghana, Sierra Leone, Senegal and Togo
54. An assessment of the critical human, financial and institutional capacity issues affecting West African research and development; Synthesis and Policy Considerations November 2014. West and Central African Council for Agricultural Research and Development (CORAF/WECARD), Dakar, Senegal

Policy briefs

55. Quelles options stratégiques pour une meilleure valorisation des amandes de karité au Burkina Faso
56. Politiques de gestion des ressources naturelles basées sur les Produits Forestiers Non-Ligneux (PFNL) au Burkina Faso : bilan et perspectives
57. Forces, Faiblesses, Possibilités et Menaces pour une meilleure prise en compte des besoins des petits producteurs dans la formulation des législations et réglementations en matière de PFNL au Gabon: Cas de l'Odika
58. Le devenir politique des PFNL/PFABO au Gabon rêve au réalité ?
59. Policy brief sur la politique de gestion des Produits Forestiers Non Ligneux en Afrique Centrale : bilan et perspectives
60. Politique de gestion des Produits Forestiers Non Ligneux en Afrique de l'Ouest : bilan et perspectives
61. Opportunités d'amélioration des contraintes affectant le fonctionnement des institutions et le bien-être des petits producteurs en matière de politiques de gestion basées sur les PFNL/PFABO au Gabon
62. Analyse économique de la chaîne de valeur Rotin, contraintes et opportunités de développement du secteur au Gabon
63. Politique de gestion des Produits Forestiers Non Ligneux en Afrique Centrale : bilan et perspectives
64. Politique de gestion des Produits Forestiers Non Ligneux en Afrique de l'Ouest : bilan et perspectives
65. Transformation des Produits Forestiers Non Ligneux (PFNL) en zone de production au Sénégal : quelle implication sur l'amélioration des chaînes de valeur et la sécurité alimentaire au Sénégal ?

Films / Vidéos

66. Un film vidéo sur le karité : https://www.youtube.com/watch?v=VaTkyN68Kdo&feature=player_detailpage

67. English:

https://www.youtube.com/playlist?list=PLjITXA8tslvobHH_F5MTLcaEYkGKXqqgf&feature=em-share_playlist_user/

Version française :

https://www.youtube.com/playlist?list=PLjITXA8tslvpNUZgG1Ditw76t-No3UJRu&feature=em-share_playlist_user

68. A video on shea nuts value chain realized in Burkina Faso :

<https://www.dropbox.com/s/o0ytoyfvbzz2ne/CORAF%20V4%20Copie.mp4?dl=0Annex 7>.



CORAF

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