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## 2018 Annual Report

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### Abbreviations & Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<td>IsDB</td>
<td>Islamic Development Bank</td>
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<tr>
<td>AGRA</td>
<td>Alliance for a Green Revolution in Africa</td>
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<tr>
<td>ARD</td>
<td>Agricultural Research and Development</td>
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<tr>
<td>AU-IBAR</td>
<td>African Union Interafrican Bureau for Animal Resources</td>
</tr>
<tr>
<td>AWPB</td>
<td>Annual Work Plan and Budget</td>
</tr>
<tr>
<td>CAADP</td>
<td>Comprehensive Africa Agriculture Development Program</td>
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<tr>
<td>CaSCIERA</td>
<td>Capacitating Stakeholders in Using Climate Information for Enhanced Resilience in the Agricultural Sector</td>
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<tr>
<td>CEMAC</td>
<td>Communauté Économique et Monétaire de l’Afrique Centrale</td>
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<tr>
<td>CILSS</td>
<td>Comité permanent Inter États de Lutte contre la Sècheresse dans le Sahel</td>
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<tr>
<td>DRI</td>
<td>Directorate of Research and Innovation</td>
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<tr>
<td>ECOWAS</td>
<td>Economic Community of West African States</td>
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<tr>
<td>ED</td>
<td>Executive Director</td>
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<tr>
<td>EnGRAIS</td>
<td>Enhancing Growth through Regional Agri-Inputs Systems</td>
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<tr>
<td>FAO</td>
<td>United Nations Food and Agriculture Organization</td>
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<tr>
<td>FARA</td>
<td>Forum for Agricultural Research in Africa</td>
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<td>GA</td>
<td>General Assembly</td>
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<tr>
<td>IAR4D</td>
<td>Integrated Agricultural Research for Development</td>
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<tr>
<td>ICRI SAT</td>
<td>International Crops Research Institute for the Semi-Arid Tropics</td>
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<tr>
<td>IDRC</td>
<td>International Development Research Centre</td>
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<td>IFDC</td>
<td>International Fertilizer Development Centre</td>
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<tr>
<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
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<tr>
<td>IITA</td>
<td>International Institute of Tropical Agriculture</td>
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<tr>
<td>IP</td>
<td>Innovation Platform</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<tr>
<td>MSME/SMI</td>
<td>Micro, Small and Medium Enterprise / Small and Medium Industry</td>
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<tr>
<td>NARS</td>
<td>National Agricultural Research System</td>
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<tr>
<td>NCOS</td>
<td>National Centre of Specialization</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<tr>
<td>NEYAT</td>
<td>Nurturing Enterprising Youth for Agricultural Transformation Technologies</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Plan</td>
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<tr>
<td>PAIRED</td>
<td>Partnerships for Agricultural Research, Education and Development</td>
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<td>RCoE</td>
<td>Regional Centre of Excellence</td>
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<tr>
<td>REC</td>
<td>Regional Economic Community</td>
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<tr>
<td>RMC</td>
<td>Regional Monitoring Committee</td>
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<tr>
<td>ROPPA</td>
<td>Réseau des Organisations Paysannes et de Producteurs de l’Afrique de l’Ouest</td>
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<tr>
<td>S-RFP-AnGR</td>
<td>Sub Regional Focal Point on Animal Genetic Resources</td>
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<td>STC</td>
<td>Scientific and Technical Committee</td>
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<tr>
<td>UEMOA</td>
<td>West African Economic and Monetary Union</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>WA</td>
<td>West Africa</td>
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<tr>
<td>WAAPP</td>
<td>West African Agricultural Productivity Program</td>
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<tr>
<td>WAATP</td>
<td>West Africa Agricultural Transformation program</td>
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<tr>
<td>WCA</td>
<td>West and Central Africa</td>
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The year 2018 was a defining moment in our journey towards advancing Agricultural Research for Development (AR4D) in West and Central Africa. The 12th Ordinary Session of the General Assembly which held in Dakar, Senegal approved a new strategic direction for CORAF. Building on a track record of lifting millions of poor farmers out of poverty over the past decades, CORAF’s highest decision-making body signed off to a plan that strengthens not only critical research partnership but also accelerates the adoption of existing innovations. The plan is aligned with the agricultural policies of the regional economic communities, the Comprehensive African Agricultural Development Program (AU-CAADP) and the Sustainable Development Goals. CORAF also elected a new Governing Board (GB) and a new Scientific and Technical Committee to oversee the implementation of the new strategy. For the first time since its founding, CORAF elected a woman to chair the Governing Board. Likewise, CORAF achieved perfect gender parity among its 12-member Scientific and Technical Committee (STC). As we welcome our new GB and STC, we also celebrate the enhanced and genuine partnership between all actors within the CORAF ecosystem, particularly National Agricultural Research System (NARS) partners involved in the implementation of CORAF’s regional programs and sub-projects, International Agricultural Research Centers (IITA, AfricaRice, ICRAF, ICRISAT and AVRDC), and advanced research institutions (CIRAD, IRD). We know that together, we can deliver innovative and meaningful results to our 23 member countries, and most importantly, to farmer-based organizations (ROPPA, PRO-PAC, APESS, and RBM). We look forward to continuing our work with those partners, agencies, institutions, and grantees to champion, the innovation, inspiration, and collaboration needed to meet challenges facing food and agriculture in the sub-region. We will continue to depend on the dedication of the CORAF community and the Secretariat staff, which provide essential support to accomplish the challenging task of coordinating AR4D in WCA. CORAF will continue to work to build the critical mass of expertise and skills needed to nurture the next generation of food and agriculture researchers. These researchers will be vital to the success of the work to be accomplished by our partners and supporters in West and Central Africa. We extend our heartfelt thanks to ECOWAS, UEMOA, ECCAS and CEMAC, and the governments of Senegal and indeed those of the other countries in the region whose NARS constitute the bulk of the CORAF constituency. Our gratitude also goes to our donors and development partners -- namely the World Bank, EU, USAID, Global Affairs Canada, IDRC, and IsDB. They have enabled us to create and execute a bold plan to contribute, through technologies and innovation, to a rapid increase in agricultural productivity across the sub-region. We encourage you to read this annual report to learn more about what we do with our partners, and we hope you will circulate it within your networks.
WHO WE ARE

CORAF is an international, non-profit association of the National Agricultural Research Systems (NARS) of 23 countries in West and Central Africa. It covers an area of 12.3 million square kilometers with over forty percent of Africa’s population.

CORAF was created in 1987 with the responsibility to coordinate and facilitate demand-driven research needed to unlock the agricultural potential of West and Central Africa. CORAF is the largest of the four Sub-Regional Organizations under the Forum for Agricultural Research in Africa (FARA).

At the national level, CORAF works with National Agricultural Research Systems (NARS), comprised of public agricultural research institutes, universities and other tertiary institutions, farmer groups, civil society organizations, the private sector, and other entities engaged in the provision of agricultural research services.
OUR AGRO-ECOLOGICAL ZONES

Our Vision

We see a future where people and communities in West and Central Africa achieve food and nutrition security and are prosperous.

Our Mission

To sustainably improve the productivity, competitiveness, and markets of the agricultural system in West and Central Africa. The primary objective of CORAF is to improve livelihoods in West and Central Africa through sustainable increases in agricultural production and productivity, promoting competitiveness and markets.

Our delivery results

Result 1
Increased use of appropriate technologies and innovations in WCA

Result 2
Informed decision-making for improved market and scaling of technology

Result 3
Increased institutional and human capacity in agricultural research for development

Result 4
Demand for agricultural knowledge from target client facilitated and met.

Read Our Strategic Plan 2018-2027
Read Our Operational Plan 2018-2022
2018 Performance Snapshot

Regional Projects coordinated: 11
MSc & PhD trained: 60
New partnerships sealed: 08
Million of USD raised: 15.8
Million of USD in Reserve Fund: 0.8
<table>
<thead>
<tr>
<th>Improved Technologies Generated</th>
<th>Female Farmers having better access to resources</th>
</tr>
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<tr>
<td>400</td>
<td>45%</td>
</tr>
<tr>
<td>Million Farmers using improved technologies</td>
<td>Tons of quality Seeds produced</td>
</tr>
<tr>
<td>100</td>
<td>10000</td>
</tr>
<tr>
<td>Young Scientists trained in MSc &amp; PhD</td>
<td>Small and medium-sized Enterprises supported</td>
</tr>
<tr>
<td>1206</td>
<td>97</td>
</tr>
<tr>
<td>Innovation Platforms Created</td>
<td>Farmers and users trained</td>
</tr>
<tr>
<td>335</td>
<td>800K</td>
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12th General Assembly

Transformative leadership in AR4D

1.1. A Forum for the CORAF Community

CORAF held its 12th General Assembly in Dakar, Senegal from April 10-12, 2018 under the theme: “What is CORAF’s Future in a Constantly Changing Regional and International Environment?”.

The Minister of Agriculture and Rural Infrastructure (MARI) of Senegal, Dr. Papa Abdoulaye SECK, presided over the opening ceremony in the presence of several ministers.

The General Assembly brought together representatives of farmer groups, the private sector, policy and decision-makers from the agricultural sector, as well as researchers. Their aim was to examine, recommend and adopt meaningful reforms that will set CORAF on a path that will help it contribute to the ongoing improvement of the agriculture sector in WCA. Senegalese Minister of Agriculture and Rural Infrastructure, H.E Dr. Papa Abdoulaye Seck challenged agricultural researchers of West and Central Africa to step up their game by addressing challenges that face their communities now, generating relevant innovations to meet their needs.

Highlights of the General Assembly included the review and adoption of CORAF’s long- and medium-term plans and the election of new members to the Governing Board. The Assembly also assessed the performance of key organs including the General Assembly itself, the Board of Directors, the Scientific and Technical Committee, and the Executive Secretariat. Further, a high-level, ministerial panel evaluated the contribution of R&D to agriculture over the previous 30 years.
The 12th General Assembly coincided with the renewed commitment of African Heads of State to have Africa feed itself and transform its countries' economies by leveraging agriculture as a source of wealth and jobs.

1.2. An aligned Vision and Mission

While CORAF’s vision and mission remain valid and compelling, the organization must align its work to trends and frameworks of the AU-NEPAD’s CAADP Phase II and Malabo Declarations. These have shifted the focus of the continental agricultural development strategy to an implementation phase. Other significant developments have been the launch of the AU Science, Technology, and Innovation Strategy for Africa (STISA 2024), which succeeded the Science and Technology Consolidated Plan of Action, 2006-2014; the endorsement by African Heads of State and Government of the Science Agenda for Agriculture in Africa (S3A) developed by FARA; the Regional Economic Community (ECOWAS, UEMOA, ECCAS and CEMAC) agricultural policies, the renewed United Nations SDGs; the African Development Bank Strategy for Transformation of Agriculture in Africa, (TAAT, AARP), the USAID Feed the Future Strategy, and the World Bank led Science for Agriculture Consortium programs focusing on climate resilience and post-harvest management. Each of these offers both challenge and opportunity for CORAF.

1.3. Celebrating 30 years of Impact on West & Central African Agriculture

CORAF is proud to celebrate 30 years of contributing to the improvement of agricultural system’s productivity, competitiveness and markets in WCA. CORAF has a comparative advantage as a convening agency. It can bring together national, regional and global stakeholders to discuss and collaborate in the transformation of agri-food systems. It contributes to the implementation of the policies of Regional Economic Communities (REC) notably ECOWAS, UEMOA, CE-MAC and ECCAS. CORAF helps to reform policies, facilitate regional cooperation and economic integration, and strengthen national agricultural research systems by building the capacity of our constituents. We help develop specialization, excellence and competence in implementing the IAR4D, while maintaining an institutional culture that attracts and retains high quality research scientists in West and Central Africa.

These actions have resulted in a wide-scale adoption of more than 400 improved agricultural technologies and innovations. They have enabled over 100 million direct and indirect beneficiaries (smallholder farmers, rural households and enterprises) in the sub-region to increase productivity and production in the agricultural sector.
1.4. Positioning CORAF in a new era of AR4D in West & Central Africa

The 12th Session of the General Assembly provided an opportunity for CORAF to demonstrate maturity and readiness to respond to the pressing challenges facing agriculture in the sub-region. These include food and nutrition insecurity, climate change, gender disparities, massive youth unemployment, and rural to urban migrations in West and Central Africa.

These capacities are at the forefront of the newly adopted Strategic Plan (2018-2027) and the associated five-year Operational Plan (2018-2022). The Strategic Plan is a roadmap for CORAF and its many stakeholders, which if followed, can result in the achievement of the CORAF vision, mission, and objectives to address the challenges of agricultural research and development in WCA. Reducing the current yield gap of 70% and post-harvest losses of 30% are among the major actions required to increase agricultural production and adequately respond to the future global demand for quality food and feed.

As regional integration continues to evolve, efficient policy coordination throughout the 23 constituent National Agriculture Research Systems (NARS) of CORAF becomes more important. Achieving the set of objectives for a productive and competitive agriculture research and innovation system requires actions well beyond the traditional mandates of NARS. The achievement of the outcomes envisioned in the CORAF Strategic Plan requires more effective coordination among all stakeholders.

Recommendations from the 12th General Assembly

<table>
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<tr>
<th>Recommendation 1 on the Capitalization of the human dimension of CORAF:</th>
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<tr>
<td><strong>The General Assembly,</strong></td>
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<tr>
<td>• Welcoming and celebrating the different distinctions and recognitions made both at continental and global level, for men and women scientists in the CORAF zone who have honored agrcultural research and development in West and Central Africa,</td>
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<tr>
<td><strong>Recommends</strong></td>
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<tr>
<td>to the Executive Secretariat of CORAF to better valorize these outstanding scientific and technical competences, in view of the accelerated development of the human resource of CORAF and those of the National Systems of Agricultural Research (NARS)</td>
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<th>Recommendation 2 on reducing CORAF’s dependence on external financing:</th>
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<tr>
<td><strong>The General Assembly,</strong></td>
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<tr>
<td>• Noting that CORAF funding consists mainly of contributions from development partners,</td>
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<td><strong>Recommends</strong></td>
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<td>to the Executive Secretariat of CORAF and NARS of member countries to set up a sustainable financing mechanism based on the one hand, on the contributions of NARS, by establishing a permanent framework of dialogue with the Ministers of Finance and other ministries in charge of the development, and, on the other hand, on the support of the Regional Economic Communities which are ECOWAS, ECCAS, UE MOA and CEMAC.</td>
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<th>Recommendation 3 on the consideration of non-forest wood products in the new Strategic and Operational Plans:</th>
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<tr>
<td><strong>The General Assembly,</strong></td>
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<tr>
<td>• After reviewing the main areas of the Strategic Plan and the Operational Plan and the targeted agricultural sectors, noting that non-forest timber products are not covered by them,</td>
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<tr>
<td><strong>Recommends</strong></td>
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<td>that the Executive Secretariat of CORAF takes into account non-forest timber products to cover all areas of the agro-silvi-pastoral and fisheries sector in West and Central Africa and offer logging companies varied opportunities for the acquisition of improved technologies.</td>
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<tr>
<th>Recommendation 4 on the governance of CORAF, its partnership with the private sector, its relationship with policy makers and the organization’s prospects for the next 20 years:</th>
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<tr>
<td><strong>The General Assembly,</strong></td>
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<td>• Expressing satisfaction with the thorough reflection from the working groups made up of authorities and high-level experts on all the above-mentioned topics, and recognizing the great value of the results of this reflection,</td>
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<tr>
<td><strong>Recommends</strong></td>
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<td>that the Executive Secretariat of CORAF reviews the results of the working groups of the 12th Session of the AG to take into account the proposals that can:</td>
</tr>
<tr>
<td>I. Provide CORAF with an effective governance mechanism (favorable to the objective of generating improved technologies), efficient (low cost) and pragmatic (facilitating the involvement of all stakeholders),</td>
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<tr>
<td>II. Strengthen CORAF’s partnership system with farmers/organizations and the private sector, particularly for youth employment and women’s entrepreneurship,</td>
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<tr>
<td>III. Develop CORAF’s relations with policy makers, in view, on the one hand, to improving the contribution of the NARS to the financing of CORAF’s strategic and operational plans, and, on the other hand, to the alignment of these plans with policies and programs for inclusive and sustainable development of the agro-silvi-pastoral and fisheries sectors of the member countries,</td>
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<tr>
<td>IV. Incorporate the actions of CORAF in view to meeting the needs of improved technologies and relevant innovations for the eradication of hunger, reduction of poverty of rural households, improvement of food and nutritional security, strengthening the climate resilience of vulnerable groups, and boosting cross-border trade</td>
</tr>
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First female elected Chair of CORAF Governing Board

Dr. Angela Maria P. Barreto da VEGA MORENO

The General Assembly of CORAF elected Dr. Angela Maria P. Barreto da VEGA MORENO as the first female Chair of the Board of Governors.

Dr. MORENO becomes not only the first female Chair but also the first researcher from Lusophone Africa to lead CORAF.

The new Chair replaced Dr. Alioune Fall, Director General of the Senegalese Institute for Agricultural Research (ISRA).

Central to the responsibilities of the new Chair is the mobilization of resources to fund activities resulting from implementing the new Strategic Plan and provision of guidance to help CORAF improve its organizational efficiency and long-term financial sustainability.

From a research perspective, Cape Verde’s assumption of the presidency of CORAF will contribute to strengthening the relations between the Island state and other countries in West and Central Africa. It will also open opportunities for the country as well as meet challenges in the agriculture sector such as lack of water and drought.

The Minister of Agriculture and Environment of Cape Verde saluted Dr Bareto daVEGA MORENO’s election. He assured that she would have the support she needed during her three-year mandate. The Government of Cape Verde urged its national researchers to make the most of opportunities within the CORAF community particularly in terms of training and the sharing of technologies and innovations.

Dr. P. Barreto da VEGA MORENO is the President of the National Agricultural Research and Development Institute (INIDA) of Cape Verde. It was created in 1979 and works on crops, livestock, forestry, and natural resource management. INIDA is the lead agricultural R&D agency under the Ministry of Rural Development in the country.
Key Messages from the High-Level Panel on «Capitalizing on the Research outputs and Financing of Agricultural Research»

What they said:

GILBERTO CORREIA CARVALHO SYLVA
MINISTER OF AGRICULTURE AND ENVIRONMENT OF CAPE VERDE

The priority of the Cape Verdean agri-silvo-pastoral and fishery sector remains the promotion of climate resilient food production systems, thus able to achieve food and nutritional security.

I. Achievement of these objectives involves the adoption of adapted irrigation systems such as «drip irrigation»,
II. the use of renewable energies,
III. the introduction of climate’smart seeds and improved and high-yielding varieties
IV. the establishment of a resilient agricultural financing and insurance mechanisms,
V. the diversification of production systems through small agri-food processing industry, ecotourism and agroecology.

I urge regional governments for a comprehensive inventory of existing to facilitate dissemination of improved technologies taking into account the socio-economic needs and agroecological policies of the CORAF member states including islands.

ASSEID GAMMAR SILECK
MINISTER OF AGRICULTURE, IRRIGATION AND AGRICULTURAL EQUIPMENT OF CHAD

Chad is regularly confronted with food insecurity and poverty through our long-standing war-torn history; a sur-priority over all other considerations of economic and social development. Chad has adopted a Five-Year Plan for Development of Agriculture backed by the National Development Plan 2017-2022 «which provides for the establishment of a system of prevention and early warning, a system of supply and food storage managed by the National Office of Food Security alongside a community management system coordinated by the National Office for Food Security, capacity building of the National Agency for Rural Development Support (ANADER) «National Extension Service» and Chadian Institute for Agricultural Research for Development (ITRAD), «country research instrument».

Our priority is to strengthen links between researchers, academics, extensionists and producers through permanent consultation frameworks to stimulate ownership by producers, end-users of the technologies generated, “by involving them in the development identification and implementation of research activities”.

DR PAPA ABDOULAYE SECK
MINISTER OF AGRICULTURE AND RURAL EQUIPMENT OF SENEGAL

Mobilizing financial resource for agricultural research is not solely the responsibility of researchers, but of all stakeholders along the value chains. The steps are as follows:

I. Change the mindset towards agriculture, by giving a status to farmers, adopting appropriate land policies to address issues related to security of land tenure
II. (iii) ensure wide dissemination of technologies and innovations through a good advisory services for smallholder farmers,
III. a robust agricultural and rural council,
IV. promoting water control infrastructures,
V. having a sustainable agricultural microfinancing, with a multi-year funding,
VI. a strong seed legislation and industry,
VII. facilitate market access,
VIII. mobilize private investment
IX. a well-equipped professional and inter-professional organizations,
X. Undertake informed advocacy on policy issues
XI. promote frameworks for consultation with stakeholders,
XII. strengthen national and regional research teams,
XIII. develop cooperation with advanced research institutions.
Recognizing CORAF champions

During the GA, CORAF recognized Mr. Abdoulaye TOURE, Lead Agro-economist at the World Bank. TOURE was honored for his significant contributions to mobilizing funding for CORAF.

The CORAF community also paid a warm tribute to Dr Ndiaga MBAYE, the former Executive Secretary of CORAF, who was called back to God on Saturday, January 5, 2018 and also to Dr. Ibet OUTHMAN ISSA, the former Director General of IRAD and former Chairman of the Board of Directors CORAF, deceased in 2014, for their contribution to the advancement of Science and the improvement of the scientific and technical performance of CORAF.

The CORAF community finally expressed its gratitude to:

- Dr. Adama TRAORE, from Mali, former Chairman of the Executive Committee of CORAF;
- Dr. Dominique HOUNKONNOU, from Benin, Expert in Agricultural Knowledge Management;
- Dr. Paco SEREME, from Burkina Faso, former Executive Director of CORAF;
- Dr. Papa Abdoulaye SECK, from Senegal, Minister of Agriculture and Rural Equipment.
The CORAF scientific community has generated a wide range of impact-oriented technologies and innovations in the crop, livestock, and fisheries sectors. These are designed to help solve major challenges related to agriculture in WCA. 2018 was a landmark year in the development and promotion of successful pathways for scaling up and scaling out these technologies and innovations. CORAF pursued new ways to bridge discovery science with dissemination of results to millions of people across the sub-region to deliver development impact. These will continue into the future.

2.1. Increasing agricultural productivity through integrated management of organic fertilizers in West Africa

The two year FERTORAO project, with support from the World Bank and participating countries (Burkina Faso, Côte d’Ivoire, Ghana, Mali, Senegal) with an initial budget of $600,000 was launched in March 2017. It aims to contribute to sustainable food security in West Africa. Its specific objective is to determine the technical and economic performance of selected organic fertilizers in order to recommend appropriate ones for promotion in West Africa.

The first year evaluation of selected organic fertilizers has shown improved performance in terms of crop yields compared to control plots, irrespective of commodities and countries. Results further show that locally available organic fertilizers, such as cow dung, have great potential to improve soil health compared to imported organic fertilizers.
2.2.  Improving the performance and competitiveness of the cotton sector by transforming stem residues into particle boards (VATICOP)

Dealing in an environmentally friendly way with plant residue left after the cotton harvest has been a challenge. In fact the most common way to dispose of stems has been to burn them. But thanks to UEMOA, which provided financial support to a project that is working towards making better use of cotton stems, the decision not to burn will be much easier.

In India cotton stems are now being made into particle boards for construction and the idea was to see if that would work in cotton growing countries of West Africa. Three sets of machines to process cotton residues into particle board have now been fabricated for Benin, Mali and Togo. A technician from INRAB in Benin visited the factory in India and evaluated their performance. The machines have already been shipped to Benin. Three students selected in Benin, Mali and Togo are conducting technical and economic studies of the fabrication of particle boards using local cotton stems.

The three teams each received a complete set of equipment consisting of: (i) a stem shredder with a capacity of 100 kg / hour, (ii) a dryer of 12 compartments with a capacity of one kilogram each, (iii) a shifter to separate fine and coarse material through sieves with diameters of 0.5 mm, 1.5mm, 3mm and 5mm, (iv) a scale to weigh the sieved products, and (v) a heated hydraulic press with temperature data controller (up to 200° C) and pressure (150 to 180 kg / cm²).

After the installation, each country team manufactured a particle board prototype based on cotton stems, following all the instructions given by the Indians. Subsequently, teams from Benin, Mali and Togo produced quality particles of 9, 12 and 18 mm diameters with the Benin manufacturing unit. According to the Head of the Indian Delegation, the cotton-based particle boards produced during the conformity test in Benin are even stronger than those made in India using similar machines. The 9 mm boards made in Benin are can withstand a third more pressure than those made in India. The difference could be attributed to the nature of Benin’s cotton stems, which are relatively thinner and hold less moisture than those in India where stems are larger. Lower moisture content makes it easier for the glue used in the particle board process to bind the cotton stem particles.

2.3.  Improving the performance and competitiveness of the livestock-meat, poultry and aquaculture sector (PROGEVAL)

PROGEVAL, a project funded by UEMOA, is showing the way in the sustainable improvement of local livestock genetic resources (Zebu cattle, Ndama taurin, sheep and guinea fowl) and aquaculture (Tilapia and catfish) to ensure food security and increase the income of producers in Burkina Faso, Côte d’Ivoire, Guinea Bissau, Niger and Senegal. Key results achieved during the reporting period are as follows:
1. **Molecular characterization of Heterobranchus longifilus, the catfish from Côte d’Ivoire:** Overall, the characterization of Heterobranchus longifilus strains using the microsatellite markers revealed a low genetic differentiation between strains. However, the study revealed a high genetic variability at the intra-population or intra-strain level. The multivariate analyses carried out allowed the distribution of individuals of six (6) populations into two (2) groups: the populations of Sassandra (north and south) relatively homogeneous on one hand and the relatively heterogeneous populations on the other hand.

2. **Genetic variability parameters of guinea fowl local breeds of Burkina are known:** On the basis of 163 DNA samples, most of the markers (12 out of 19) were efficient in distinguishing the samples regarding the value of Polymorphic Information Content (PIC > 0.5). The phylogenetic analysis performed between the different guinea fowl subgroups reveals a weak differentiation; however the Dori and Fada subpopulations are quite distinct from the others.

3. **Cryoconservation parameters of the seed of the Kou strain of Oreochromis niloticus with soft roe are determined:** The results obtained indicate that it is possible to keep the pure milt at 4°C for one hour without denaturing the sperm. After one month of cryopreservation, exposure to 6 cm of liquid nitrogen gave the highest percentages of resuscitation at 70-80% for Freshwater Fish Saline and 50-80%, for modified Ringer diluents.

**2.4. Creating a fruit fly-free zone in West Africa**

The Fruit Fly Control Project (PLMF) with support from the European Union, aims at improving the income of fruit and vegetable producers, particularly small producers, so as to contribute to food security in the sub-region and to reduce poverty. Specific objectives of the project are: (i) to increase the volume of fruit free from infestations in local markets, (ii) and to control the loss of fruit and vegetables due to infestation by fruit flies. This project is implemented in 10 countries: Benin, Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea, Mali, Nigeria, Senegal and Togo. Results achieved so far include:

1. **Improved knowledge on biology, ecology and physiology of fruit flies:** an entomofauna associated with the infestation of flies has been demonstrated as well as a diversity of parasitoids that may play a role in the control of fruit flies.

2. **Effective natural attractants identified:** Significant progress has been made in the control of fruit flies through the development of improved detection and control techniques such as the identification of natural attractants. To that effect, the Ocimum canum plant has been identified to attract exclusively male flies. Other attractants such as:
   1. brewer yeast waste + papaw extract;
   2. the Syzygium aromaticum oil extracted from the clove plant for C. cosyra;
   3. eugenol isolated from clove oil; and
   4. aqueous extract from the Pimenta racemosa leaves, are now at the demonstration phase.

3. **Biological control techniques developed and improved:** Mass breeding of parasitoids (Fopius arisanus, Diachasmimorpha longicaudata) is mastered and even optimized in some countries and releases have been made. Studies conducted on the compatibility of Fopius caudatus Szepligeti with Oecophylla longinoda Latreille have shown that O. longinoda reduces the rate of parasitism of F. caudatus. However, the infestation of Ceratitis cosyra is lower in the presence of both biological control agents than in the presence of a single control agent. The combination of these two biological control agents (Fopius caudatus and Oecophylla longinoda) may be desired for more efficient management of C. cosyra.

Field evaluations for the persistence of two local isolates of entomopathogenic nematodes Heterorhabditis sonorensis between two mango seasons showed persistence in the soil for up to six (6) weeks after inoculation at depths of up to 20 cm. For a better use of entomopathogenic nematodes to control the fruit flies in the inter-seasoning of mangoes, it is therefore desirable to renew the application after three (3) to six (6) weeks of inoculation.

Aqueous formulations of M. anisopliae have been shown to be effective against fruit flies (B. dorsalis). Strains of entomopathogenic fungi Beauveria bassiana and Metarhizium anisopliae have significantly influenced the mortality, pupation and emergence of Dacus vertebratus (Bezzi) larvae.

The cashew balm formulations namely the alcoholic formulation (Balm + Alcohol 5%) and the aqueous formulation (Balm + Water + Soap) were effective against third level larvae of Bactrocera dorsalis and persisted for one and two weeks respectively in the soil.

4. **Effective natural pesticides to control fruit flies developed and improved:** Neem, eucalyptus and hyptis extracts have shown an effectiveness of 46%, 55%, 77% respectively against fruit flies;

5. **Integrated pest management strategies adapted to the different agro-ecological zones:** Trials were established to assess the effectiveness of the different combinations of IPM techniques (Collection (R), Timaye (T), GF120, M3, release of parasitoids, Ants (F) on the level of fly infestation. Results so far in 500 ha show a good level of protection regardless of the combination compared to the control.

The project recorded two success stories: i) Establishment of a cooperative as a result of an Innovation Platform’s activities in Benin; and ii) Two farmers were distinguished as “best mango producers of Côte d’Ivoire, for the quality of their fruits and the yield of their orchards”.

2.5. The West Africa Agricultural Productivity Programme (WAAPP)

The project development objective (PDO) of WAAPP is to generate and accelerate the adoption of improved technologies in the participating countries’ agricultural priority commodities that are aligned with the sub-regional priorities, as aligned in the agricultural policy (ECOWAP). The objective of the second phase is to scale-up the generation, dissemination and adoption of improved technologies in the participating countries. As the WAAP program folds up after 10 years of implementation, the key performance indicators related to the PDO indicate that significant progress has been achieved and all targets have been surpassed except for the technologies imported from other countries (Figures 1 - 6). The major achievement under component 2 is the upgrading into Regional Center of Excellence (RCoE) of two (2) Regional Centers of Specialization (RCoS) notably Dry Cereals and Roots & Tubers while three (3) National Centers of Specialization (NCoS), Maize, Livestock and Rice) were upgraded into RCoS following the second evaluation NCoS.
Fostering a conducive policy environment

CORAF provides support to the two Regional Economic Communities by contributing to the development and recommendation of policies and strategies aimed at increasing agricultural growth and socio-economic development within the agricultural sector. Here are some examples:

3.1. Policies for sustainable use of animal genetic resources in West Africa

Animal Genetic Resources (AnGR) for food and agriculture are essential for Africa's food security and contribute to the livelihoods of millions of people. Many genetic improvement programs in Africa have favored the use of exotic breeds for crossbreeding, upgrading or replacement. Since exotic breeds by definition are not native to the region, this practice can pose risks. Nevertheless, these programs have mostly been implemented without clear policies and regulatory frameworks.

CORAF has developed key frameworks to guide the development of regional policies that will impact positively on the conservation of animal genetic resources in its role as the West Africa Focal Point for the project “Capacity Strengthening of African Countries for Conservation and Sustainable Use of Animal Genetic Resources” funded by the EU through the African Union. These frameworks advocate the establishment of regional associations of transboundary animal breeders, the development of a regional catalogue on cattle breeds in the ECOWAS region, to conduct an inventory of trends and risks associated with animal genetic resources in West Africa and finally the development of a virtual gene bank in West Africa.
3.2. Supporting policies to improve seed quality and trade in West Africa

CORAF, has been mandated by the regional organizations (ECOWAS, UEMOA and CILSS) to lead the implementation of the regional harmonized seed regulation and seed policies. In that vein and within the framework of two key projects Partnership for Agricultural Research, Education and Development (PAIRED) and the West Africa Agricultural Productivity Program (WAAPP), is providing technical support in promoting and enforcing the implementation of the harmonized policies.

During the fiscal Year 2018, the major achievements of this assignment are

1. training and backstopping the Member States to fully align with the regional regulation and procedures and
2. organizing the fourth ordinary session of the Regional Committee for Seeds and Seedlings for West Africa (CRSPAO) was held in Dakar, Senegal from July 9 -11, 2018. This statutory meeting gathered 76 high level participants, including Chairpersons of the National Seed Committees and Heads of Seed Quality Control and Regulatory Services from member countries. The meeting was co-chaired by the Representative of the member holding the Chairmanship of the Conference of Heads of State of ECOWAS and the Representative of the member state holding the Chairmanship of the UEMOA Council of Ministers.

The meeting provided an opportunity for each country to present the level of progress in the implementation of the harmonized regulation governing the production, the quality control and the marketing of seed within the UEMOA-ECOWAS and CILSS region. The focus of the milestones tracked and discussed by the meeting were:

1. the national required procedure to implement the regional harmonized regulation;
2. the free movement of seed within the region,
3. the Mutual Recognition & Equivalence principle and the international Standards Recognition; and
4. the Information sharing.

The meeting likewise analysed the challenges faced by the Member States such as:

1. ignorance of the Regional Regulation by stakeholders,
2. lack of Operational Seed Labs & of Reference Seed Labs in some countries,
3. the Insufficient number of seed inspectors and certification agents in most of countries,
4. the inoperative Seed Sector Support Fund provision; and
5. the weak capacity of National variety release Seed Committees.

Overall, it emerged that the process of implementing the regional seed regulation still faces at least three strategic challenges that deserve urgent action:

1. convincing public decision-makers;
2. engaging the private sector, and
3. reducing other major shortcomings associated with seed quality and trade.

The meeting formulated the following recommendations:

Conduct advocacy, sensitization and training sessions;

- Support the creation of two regional reference seed labs;
- Train stakeholders in variety release, seed quality, control & certification, and plant species control & certification;
- draft a ‘modus operandi’ document (Procedure Manual) for seed Support Funds;
- ensure completion of all required documents and the availability in the three languages of the region :French, English & Portuguese.
Unlocking institutional & human potential

Agriculture research and development (R&D) in West Africa was in a bleak state in 2008. With a loan from the World Bank and the support of CORAF, about 13 West African countries involved in the West Africa Agriculture Productivity Program funded post-graduate studies for young researchers. Overall, about 1000 young scientists, including about 30 percent of women received scholarships to pursue master degrees and Ph.Ds. in priority areas.

In 2018, CORAF undertook key reforms aimed at nurturing an enabling institutional environment for Science in the Research and Development ecosystem of WCA. NARS constituents are being empowered to set up functional systems to advance Science, Technology and Innovations for agricultural transformation and to create innovative models for the delivery of relevant research results.

4.1. Strengthening the institutional capacity of CORAF

The Partnerships for Agricultural Research, Education and Development (PAIRED) Project, with 15 million USD USAID support of for CORAF, started in 2017. The project will run for 5 years. PAIRED supports CORAF to undertake systemic reforms that will improve the efficiency, effectiveness, and professionalism of the organization. The goal is for CORAF to be the premiere instrument for regional coordination of agricultural research, while on the path to financial sustainability. PAIRED has three components:

1. Strengthening CORAF’s institutional capacity,
2. Scaling up agricultural technologies and innovations in West Africa, and
3. Increasing production and marketing of quality seeds in West Africa.

USAID support has contributed to improving CORAF’s organizational structures, processes, resources, management and governance. Achievements under the PAIRED umbrella include the development of CORAF’s 2018 - 2027 Strategic and Operational plans, strategic diversification of the membership of CORAF organs (Governing Board and Scientific and Technical Committee); branding with a new logo and improved Information, Communications and Knowledge Management systems. In
addition, the program has supported enhancing staff capacity in the use of IT platforms, networks and systems. It has also improved CORAF’s financial sustainability, staffing and the prospects for CORAF of attaining the official status of Public Interest Organization.

4.2. Two Regional Centers of Specialization upgraded to Regional Centers of Excellence

the two of the nine Regional Centers of Specialization (The Dry cereals RCoS hosted by ISRA in Senegal and the Roots and Tuber RCoS, hosted by CSIR in Ghana) have been upgraded to Regional Centers of Excellence (RCoE) following an evaluation of the nine centers. In addition, three National Centers of Specialization (NCoS) - (Maize led by INRAB in Benin; Livestock led by INRAN in Niger; and Rice led by IER in Mali) were officially recognized as Regional Centers of Specialization (RCoS) having met the requirements.

CORAF supports the NCoS in the development of their training modules and the organization of regional training workshops by financing some participants to attend. For the period under review, three NCoS (Banana Plantain, Rice and Livestock) have conducted regional training workshops.

4.3. Nurturing human capital for AR4D in WCA

CORAF played a significant part in helping the region meet the challenge of helping nurture qualified people to undertake R&D in WCA. CORAF supported 28 candidates, of 8 for MSc and 20 for PhD, under the Capacity for Agricultural Research for Development (C4R4D) Project. This is funded by the International Development Research Centre (IDRC) of Canada, coordinated by CORAF and implemented in collaboration with IITA in four countries: Chad, Democratic Republic of Congo, Sierra Leone, and Togo. After their research proposals had been approved by their IITA supervisors, each student received a research grant to support data collection. The project’s average contribution per student was CAD$14,600. Twenty-five laptops were also provided to the students by the project.

This project made an contribution to strengthening the capacities and skills of women scientists: 43% of scholarships were given to females. Out of the 28 students supported by the project, 12 females (5 MSc and 7 PhD) have already graduated. The key challenge, however, was identifying suitable female participants in some countries like Chad (Figure 7).

Out of 28 students, 18 were assigned research supervisors from IITA. All awardees travelled at least once to IITA hubs. The IITA supervisors, in collaboration with their national counterparts, have helped each student to better refine his/her research topic with the appropriate objectives, experiment design and implementation plan. The mentoring of students by IITA scientists could be used as a model in future partnership programs. The project provided an opportunity for a CGIAR institution to contribute towards strengthening the capacity of the NARS within the CORAF coordination framework.

Funded by WAAPP, Niger’s Halidou Maiga Naffisatou dreams to use science and innovations to increase milk production.

Figure 7: Number of PhD and MSc students by sex and country under the C4R4D Project
4.4. Using climate information for enhanced resilience in the agricultural sector

Capacitating Stakeholders in using Climate Information for Enhanced Resilience in the Agricultural Sector in West Africa (CaSCIERA-WA) is a project launched in October 2017 in Bamako (Mali). It is funded by CORAF and participating countries (one million USD provided by CORAF and 1.7 Million USD provided by the participating countries). The project aims to provide access and use of reliable climate information to inform decision makers in the agricultural sector. This approach is instrumental in strengthening farmers’ resilience to climate shocks. The objective of this initiative is put into use, in a participatory manner, existing approaches to support farmers and local communities so they can plan their livelihood activities associated with agriculture in Benin, Guinea, Niger and Togo.

In 2018, key achievements of the project were: (i) enhanced capacity of 19 participants in data merging (April 3-7th 2018, Cotonou, Benin); (ii) strengthened capacity in historical climate data analysis of 24 participants facilitated by University of Reading (April 9th -13th, 2018, Cotonou, Benin), and (iii) increased awareness in Participatory Integrated Climate Services for Agriculture—PICSA (April 16-20th, 2018, Cotonou, Benin) of 27 country Specialists.

After these regional trainings, the project teams in the countries, in collaboration with the regional coordination, made plans to conduct training on Participatory Integrated Capacity Strengthening in Agriculture (PICSA) to empower extension staff so that they can roll out the approach among farming communities. In addition, the World Agroforestry Centre, ICRAF, participants in all three countries to conduct surveys using tablets improve data collection and reduce data errors.

4.5. Mass training of Innovation Platform facilitators

Innovation Platforms are effective tools for addressing the socio-economic and institutional problems faced by small producers. Those problems include lack of access to new technologies and innovations. The IAR4D approach is now recognized as critical for agricultural development. In this regard, the GRAD-ICRA-IITA consortium was contracted by CORAF under WAAPP and funded by the World Bank, to support five countries (Niger, Mali, Guinea, Benin and Togo) to use IPs to accelerate the adoption of transformative technologies and innovations. The first phase of training was conducted in Benin, Guinea, Niger and Togo on 23-27 July 2018, 18-22 September 2018, 09-13 July 2018 and 13-17 August 2018, respectively. This phase allowed IP members to better understand IAR4D approach, IP innovation systems, and value chain concepts. Participants also gained knowledge of tools for analyzing value chains and setting up innovation platforms. Most of the participants van now facilitate the process of setting up an innovation platform, while all participants can conduct a learning cycle for the resolution of a constraint through innovation. The second phase of the training will focus on the theories of change and will develop some tools for facilitating scaling and change through innovation.

4.6. Gearing up for the West Africa Agriculture Transformation Program (WAATP)

The West Africa Agricultural Transformation program (WAATP) is a sub-regional program to be implemented in ECOWAS countries and in two countries of Central Africa (Cameroon and Chad). The new programme has five components:

1. Strengthening the new model of innovation delivery;
2. Accelerating technology adoption and job creation using demand-driven market-based approaches;
3. Policies, Markets and institutional strengthening;
4. Contingent emergency response; and
5. Project management, Learning, monitoring and evaluation. The objective is to accelerate massive adoption of improved technologies, youth job creation, and to strengthen enabling conditions for access to regional markets.

However, the approval process has experienced some delays.

The CORAF secretariat supported the activities of the initial target countries: Cameroon, Chad, Liberia, Sierra Leone, Burkina Faso, Côte d’Ivoire and Ghana, to prepare key documents required for participation in the program. It also provided support in evaluating capacities of Cameroon’s research institutions so they could set up two NCoS (Legumes and Dairy). CORAF provided WAATP target countries with the terms of reference (ToRs) and financial support for the development of three environmental safeguard and social development documents:

1. Environmental safeguard and social management framework (ESMF);
2. Pest and Pesticide Management Plan (PPM); and

These have enabled those countries to submit relevant documentation and are being evaluated by the World Bank for further approval that will lead to signing of agreements.

4.7. WAAPP partners introduced to computerized M&E systems

CORAF organized and facilitated a distance training session in July, 2018 to increase the capacity of Monitoring and Evaluation (M&E) specialists on the data collection methodologies for WAAPP indicators, This followed earlier sessions in April.
M&E specialists from Benin, Guinea, Togo and Niger, participated in the online course. It also gave them an opportunity to discuss challenges faced by countries as well as possible solutions to overcome them.

While the online learning was valuable, participants also recommended holding a face to face meeting on the harmonization of data collection.

This meeting and workshop took place on August 13-15th, 2018 in Dakar. It included M&E specialists of WAAPP Additional Financing countries (Benin, Guinea, Togo and Niger). At the end of the session,

1. there was a common understanding of the definition and data collection methodologies of WAAPP indicators,
2. the WAAPP M&E manual was updated,
3. data quality assessment improved in the countries, and
4. the project impact assessment methodology was well mastered by participants.

**4.8. Improving value chains of Cotton, maize and livestock in UEMOA countries**

Under the project Converting cotton stems into wood products - VATICOP) aimed at improving performance and competitiveness of the cotton sector, local manufacturers, technicians and the Innovation Platform actors of Benin, Mali and Togo are now able to independently install and start up a TC-based PP manufacturing unit: 14 participants including two women, were trained by the Indian delegation to assemble and install the entire pilot manufacturing unit.

In Côte d’Ivoire, the AMAFINE Project (Setting a suitable and sustainable financing mechanism for trade in the maize value chain in UEMOA zone) aims to improve access to finance for those working along the maize value chain in Benin, Burkina Faso and Côte d’Ivoire. It helped organize meetings between the “Cooperative d’Épargne et de Crédit” (COOPEC) and members of the Platform. This resulted in an agreement with COOPEC to financially support members of the Platform. In the agreement, each actor will receive a loan of CFA 100,000 that will be reimbursed with an interest of 7% within a seven month period. The outcome of the agreement as to date is that the 309 farmers trained by the project opened accounts with COOPEC, as a prerequisite to receive the loan.

Overall, the project trained 335 people (35% women) to use the financing model promoted by the project. The project also provided support to twenty-seven students (10 BSc, 10 Masters and 7 PhD of whom 35% are women) to conduct their research on topics related to the pricing and value of animal and aquaculture genetic resources. Four students at masters and 10 at BSc have already graduated.
CORAF has made considerable progress in forging partnerships and strategic alliances that will foster agricultural innovation in research and technology generation. The goal is to ensure that agricultural technologies result in measurable impact on livelihoods and the quality of life of farmers and others in the relevant value chain.

### 5.1. **Response to Fall Army Worm and virus diseases in West Africa**

CORAF through the PAIRED project and WAAPP joined the fight against the menace of the Fall Army Worm (FAW) in West Africa. CORAF is a key member of the R4D International Consortium led by CIMMYT and including the AU, IITA, FAO, USAID, AGRA, CABI, and ICIPE. The science-led team will collaborate to find the most effective practices for FAW management.

They are developing a surveillance system for monitoring, early warning and control and are also training technical staff within the ECOWAS region to manage the growing threat of the pest. In the meantime, CORAF has commissioned a proposal to quantify the damage done by the pest in West Africa and current efforts made by countries and development partners in managing the pest. It is led by INRAB of Benin as it hosts the Maize NCoS, and has a budget of about $US 200,000. The output of this work will inform and enhance CORAF’s coordination of FAW mitigation effort in the region.

CORAF, World Agroforestry (ICRAF) and the University of Félix Houphouët Boigny (UFHB) of Côte d’Ivoire are developing a plant protection proposal under the auspices of the West African Virus Epidemiology for food security (WAVE) programme.
CORAF has also signed an MoU with UFHB with regards to

1. Establishing regulations for the management of viral diseases of root and tuber crops;
2. Setting up an innovative, participatory monitoring system for these diseases;
3. Developing regional early warning and response strategies against Cassava Brown Streak Disease (CBSD) and other emerging plant diseases; and
4. Deepening the diagnosis and characterization of viral diseases of root and tuber crops.

5.2. Supporting a robust Seed industry in West Africa

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One of CORAF’s significant successes in the seed sector has been the development of a common seed regulation framework that is now adopted by most West African countries. CORAF also helped develop a seed catalog for the region.

Now CORAF is working to get buy-in from more of the private sector in all aspects of the seed sector. Members of the Alliance of Seed Industry in West Africa (ASIWA) and Private sector are working to foster greater ownership, define actions to spin off ASIWA and propose mechanisms for its sustainable funding, including the creation of a secretariat.

CORAF realizes that pooling the efforts and knowledge of various groups and organization will strengthen the West Africa fertilizer market. To this end CORAF through PAIRED has partnered with the USAID funded Enhancing Growth through Regional Agricultural Inputs Systems (EnGRAIS) (implemented by the International Fertilizer Development Centre (IFDC)), to provide the region with critical input packages, including fertilizer and seeds, recommendations on best practices, and delivery strategies to ensure that these inputs are effective in improving agricultural productivity in the sub-region.

CORAF now hosts EnGRAIS personnel at its headquarters. This has enhanced the collaboration between both project teams. One result is a West Africa map on seeds and fertilizers, focusing on registered varieties for targeted agroecologies. This has been done in combination with site specific fertilization recommendations for those agroecologies. Moreover, a weather forecasting tool will be jointly promoted by the two projects to enhance farmers’ ability make wise cropping decisions.

A renewed interest in CORAF from the donor community

CORAF has attracted the attention of both traditional and new development partners. This is a result of the positive reforms being implemented by CORAF in support of Agricultural Research and Development. Immediately after the 12th General Assembly, CORAF was contacted by the European Union Commission (EUC), the Swiss Development Corporation (SDC) and the Agencia Española de Cooperacion Internacional para el Desarrollo (AECID). This resulted in the submission of three proposals to the EU and another two proposals to the SDC. Moreover, CORAF was invited by the International Fund for Agricultural Development (IFAD) to participate in a bid for a grant project under the Agricultural Research for Development (AR4D) Initiative of IFAD, and we responded accordingly. In addition, the Bank of Development in West Africa (BOAD) contacted CORAF to explore the possibility for funding bankable projects. Discussions were far advanced by the end of 2018.
Under the TAAT framework, CORAF has been approached by MARKET MATTERS INC (MMINC) to expand its reach in six West African countries where it will measure, track, and conduct analysis on seed industry competitiveness, policy and regulations. This will be done through a collaborative research initiative of the African Seed Access Index (TASAI) and the Emerging Markets Program of Cornell University, in order to build a vibrant private sector-led seed system serving smallholders in the region.

### 5.3. Achieving rice self-sufficiency

As rice is a the primary staple foods for most of the 430 million people living in West and Central Africa, AfricaRice, the World Bank, and CORAF have joined forces to develop effective and efficient rice value chains. Highlighting the vital importance of mobilizing global knowledge for Rice Research in Africa, the 31st Ordinary Session of the Africa Rice Centre Council of Ministers called on AfricaRice to strengthen collaboration with major rice initiatives in Africa including the National Centre of Specialization on Rice (NCoS-Rice) under WAAPP coordinated by CORAF.

In addition, CORAF through WAAPP is providing funds to support the Integrated Breeding Platform (IBP) hosted by AfricaRice in the targeted National Centers of Specialization (NCoS) and the Regional Centers of Excellence (RCEs) including the one on Dry Cereals based in Senegal. The objective of this collaboration is to ensure the adoption of good plant breeding practices and increase the efficiency and effectiveness of breeding programs to produce high yielding and more resilient rice varieties in WCA.

### 5.4. Linkages for crop improvement in WCA and resilience in the Sahel

Over the past years, the ties between the West Africa center for Crop Improvement (WACCI) and CORAF have grown, particularly through the training of young plant breeders sponsored by the CORAF coordinated programs. WACCI continues to bring much needed breeding expertise in a growing group of scientists in the CORAF community. The Executive Director of CORAF serves on the WACCI board, and the Director of Research and Innovation presented the CORAF Strategic Plan to the WACCI International Conference on Food and Nutrition Security held on October 03 & 04, 2018 at the University of Ghana, Legon Campus. The meeting marked the 70th anniversary of the University of Ghana.

CORAF joined twelve other Sahelian-based national and regional research institutions as part of the Sahel Alliance and signed the 'Ouagadougou Declaration' committed to working together to scale up the impact of research for the benefit of the populations of the Sahelian region and beyond.
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Progress on Gender and Youth

In West and Central Africa, youth and women face major difficulties resulting from low levels of education; insufficient or poor access to knowledge and research outputs; to financial services; to lands and markets. These are important issues that call for training and education to harness the energy of youth and wisdom of woman to enable them to start up agri-businesses, create jobs and wealth. Agriculture and entrepreneurship is the marriage of agriculture and entrepreneurship. CORAF has developed an innovative approach to agripreneurship that lets young men and women exercise managerial skills and business acumen, while generating growth and income in the agriculture sector.

Gender equity leads to greater impact, better agricultural practices. Equitable access by men and women to productive resources can improve productivity, incomes and livelihoods. CORAF weaves gender research and analysis into its portfolio and is committed to closing the gender gap with the goal to enhance the well-being of men, women, youth and children.

6.1. Measuring women’s empowerment in agriculture

CORAF continues to roll out gender action plans through projects in beneficiary countries. CORAF’s Gender Adviser assessed the state of implementation of WAAPP 2A and 1C Additional Financing (AF) countries gender action plans. Improvements in gender equity resulted from actively encouraging women’s participation and triggered interesting results at the national level, ranging from improved production diversity, behavior change, and women’s empowerment.

“CORAF is a solution to women’s problems,” Ms. Aissata Ba, Representative of the Dakar-based ECOWAS Center for the promotion of gender issues
WAAPP performance Indicators show that the 40% target set for gender participation has been met by most participating countries. For example in Niger, the gender mainstreaming in WAAPP funded projects triggered more women participating in the aquaculture value chain from fish production, value-addition and marketing in Galla kaïna village. CORAF also urged the local government of that village to provide support to women who process milk and the traditional cheese called ‘Wangash’, to help set up their business. Niger also made efforts to improve the nutritional status of children by providing fortified bread to orphans of the SOS Village in Niamey.

Gender mainstreaming in projects in Senegal: (i) distributed environmentally friendly packaging to women in Ndioum village; (ii) distributed 700 seeders, 700 lifters to women’s associations; (iii) provided training on agro-processing technologies transferred from Benin for groups of women; and (iv) implemented an aquaculture project in the Senegal River for women in the Richard Toll region.

Following CORAF’s support, Togo also delivered gender-equitable benefits to the most vulnerable by providing shelling machines, and maize and rice seeds to cooperatives of over 2700 women. Close to 1000 women also benefited from training on maize and rice seed multiplication and conditioning, as well as System of Rice Intensification (SRI) methodology.

6.2. Enhancing Leadership and Scientific capacity of gender specialists

From 23rd - 26th April 2018, CORAF facilitated refresher gender training for the gender specialists for WAAPP 1C AF countries. Five women researchers from Senegal, Mali, Burkina Faso, Côte d’Ivoire and Cameroon who benefited from AWARD (African Women in Agricultural Research and Development) program also attended.

This effort enhanced the leadership and scientific capacity of female researchers and was supported financially by WAAPP. The training took place at the Executive Secretariat of CORAF in Dakar. Participants learned not only gender theories, but also practiced the use of gender tools for gender analysis, assessment and mainstreaming in AR4D projects.

6.3. Documenting gender-sensitive technologies in WA

Under WAAPP, a number of technologies were classified as gender sensitive. This was based on their proven labor-saving attributes, and potential for job creation and income generation for vulnerable groups such as women and youth. Following submission of the list of gender sensitive technologies by nine NCoS (Benin, Senegal, Togo, Mali, Ghana, Côte d’Ivoire, Niger, Nigeria, Guinea) a directory was developed and integrated in the online MITA system (www.mita.coraf.org).

6.4. Advocating for gender equity into AR4D Agenda

CORAF has contributed significantly to gender mainstreaming at regional and continental levels through high level gender policy dialogues and partnerships on gender equality in agriculture by: (i) providing technical support on gender at the second clinic of the National Investments Plans for the ECOWAS member countries; (ii) supporting participants to mainstream gender in project activities and outputs at the planning and review meeting of UEMOA funded projects held in Ouagadougou; (iii) providing gender training for UEMOA regional stakeholders in Cotonou from March 12 to 16, 2018; and (iv) contributing to a panel during the AfricaLead-USAID lessons learned event held in Nairobi from February 20 to 22, 2018. In addition, a CORAF presentation on lessons learned from the WAAPP gender strategy, activities and technologies that can contribute to the transformation of African Agriculture, was shared with participants.

6.5 Mentoring youth to shape the future of agriculture in WCA

The CORAF’s mentoring program “Nurturing Enterprising Youth for Agricultural Transformation Technologies (NEYAT)” (http://neyat.org/) launched on December 18th, 2017 in Dakar Senegal. The program has financial support from the Islamic Development Bank (IsDB) and the World Bank through WAAPP.

Since then, CORAF improved the capacities of selected youth via a distance learning platform. This online program facilitated communication between mentees and mentors, and monitoring by the mentors, even though they were spread across several countries in West Africa. CORAF is now in finalizing contracts with 14 specialists, based in the NCoS and RCoE on selected technologies and innovations to create direct linkages and follow-up with the mentees.
Administration and Finance

7.1. Human resource mobilization by CORAF
The Executive Secretariat continues to pursue efforts to build its human capital by recruiting new talent. The current staff complement is 29, thanks to support received from USAID under the framework of “Partnership for Agricultural Research, Education and Development” (PAIRED) project. CORAF has also achieved virtual gender balance, as 48% of staff across all categories are women.

7.2. Financial situation and resource mobilization
During 2018, CORAF made continuous progress toward financial sustainability. The Institution increased reserve funds through project management fees and from other sources. The reserve amount as of December 31, 2018 was 803,936 USD, compared to 417,939 at the same point in 2017 – an increase of almost 100%.

CORAF is still working to raise resources to ensure proper funding of its Operational Plan (2018 - 2022). To this end, a cooperation agreement has been signed with USAID for 15,000,000 USD as part of the “Partnership for Agricultural Research, Education and Development” (PAIRED) project.

Advocacy by CORAF for sustained funding for agricultural research contributed significantly to the World Bank engaging countries in the CORAF region to develop a new program called the ‘West Africa Agricultural Transformation Program’ (WAATP).
This new program will scale up WAAPP achievements. Progress in the evolution of WAAPP to WAATP and other CORAF initiatives encouraged the Government of Chad to request CORAF to facilitate its integration into the NCoS network, so that it could benefit from the associated technologies and innovations, dissemination approaches and capacity building of the program. This collaboration will be implemented within the framework country’s Climate Resilience Agriculture and Productivity Enhancement Project (ProPAD). ProPAD was approved by the World Bank in April 2018 and the Government of Chad has allocated 790,000 USD for CORAF’s support.

WAATP unlike WAAPP, will be extended to additional countries in West Africa (Cape Verde and Guinea Bissau), as well as Cameroon and Chad. However, apart from Chad’s ProPAD, the approval process for the rest of the WAATP has known some delays. Table 1 presents the financial situation of CORAF projects as at December 31st, 2018.

<table>
<thead>
<tr>
<th>Financial partners</th>
<th>Total amount USD</th>
<th>Amount disbursed USD</th>
<th>Balance USD</th>
<th>Closing date</th>
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<tr>
<td>WAAPP/BM 2A</td>
<td>7 192 000</td>
<td>6 895 476</td>
<td>296 524</td>
<td>31/12/2018</td>
</tr>
<tr>
<td>WAAPP/BM 1C Add Financing</td>
<td>4 558 124</td>
<td>3 567 503</td>
<td>990 623</td>
<td>31/12/2019</td>
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<tr>
<td>USAID/PAIRED</td>
<td>15 000 000</td>
<td>953 976</td>
<td>14 046 024</td>
<td>19/06/2022</td>
</tr>
<tr>
<td>ECOWAS (Fruit flies)</td>
<td>2 335 404</td>
<td>2 053 252</td>
<td>282 152</td>
<td>18/08/2019</td>
</tr>
<tr>
<td>UEMOA</td>
<td>3 000 000</td>
<td>2 669 908</td>
<td>330 092</td>
<td>31/12/2019</td>
</tr>
<tr>
<td>Islamic Development Bank</td>
<td>140 000</td>
<td>40 907</td>
<td>99 093</td>
<td>ND</td>
</tr>
<tr>
<td>Chad and World Bank (ProPAD)</td>
<td>790 000</td>
<td>790 000</td>
<td></td>
<td>31/12/2022</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>33 015 528</strong></td>
<td><strong>16 181 022</strong></td>
<td><strong>16 834 508</strong></td>
<td></td>
</tr>
</tbody>
</table>
Conclusion, Challenges and Looking Ahead

8.1. Conclusion

The CORAF scientific community has generated impact-oriented technologies and innovations in the crop, livestock, and fisheries sectors that underpin the livelihoods of smallholders to help solve major challenges in agriculture in WCA. The 12th Session of the General Assembly provided an opportunity to demonstrate the maturity of the organization. 2018 was a landmark year in the development and promotion of successful pathways for scaling up and scaling out these agricultural technologies and innovations. New, creative ways to bridge discovery science with delivery of its results to millions of people across the sub-region to impact livelihoods will be pursued. Among these are the empowering of women and youth to enable them to start agribusinesses, to create jobs and wealth.

CORAF is increasingly appealing to development partners and a broad range of stakeholders, thanks to reforms already implemented. With a new Governing Board, a new Scientific and Technical Committee, a new forward looking Strategic Plan, a dedicated staff and good management of resources, CORAF hopes to solidify support for AR4D. There has been immediate good news. Shortly after the 12th General Assembly CORAF was contacted by old and new partners and donors (the European Union Commission, the Swiss Development Corporation, the Agencia Española de Cooperación Internacional para el Desarrollo, the International Fund for Agricultural Development) to participate in bids for possible funding.
CORAF also participated in high level consultations and established strategic alliances with key stakeholders in research and agricultural development (FARA, AfricaRice, ICRI SAT, WACCI, AVRDC, ICRAF, ECOWAS, to name a few) for the planning of new projects and initiatives.

8.2. Challenges

Delays in the approval process of the WAATP for countries in West and Central Africa as well as for CORAF by the World Bank, and a delay in the disbursement of other project funds (AU-IBAR, UEMOA, Fruit flies) presented a major challenge during 2018. Further, a deteriorating security situation in the CORAF zone (particularly in the Sahel) added an additional burden on the Institution. In response, CORAF will develop and put in place a new security policy to prevent or minimize potential risks that could be detrimental to both the smooth implementation of projects, and the institution’s staff and properties.

8.3. Looking to the future

The Executive Secretariat, in keeping with the directives of the Governing Board, continues to increase the momentum for increased fundraising necessary to implement the Strategic and Operational Plans adopted at the 12th General Assembly. This requires effective human resources. Human capital is of utmost importance the achievement of institutional objectives. While keeping a reasonable core staff as recommended by the Governing Board, specific staffing will be pursued to meet the challenges of the growing number of incoming projects and programs in 2019.

Prudent financial governance will continue and this will include the application of the “full cost recovery mechanism” in the management of donor funds, the maximization of reserve funds, and the proper and coordinated closure of projects. Dissemination of well-packaged communications on the impact of projects and other CORAF interventions are among key strategies CORAF will deploy to mobilize funding that will enable research and the scaling of its results to enhance prosperity, food, and nutrition security in West and Central Africa.
CORAF is supported by foundations, international bilateral organizations, regional and continental development organizations, and international Agricultural Research centers and organizations around the world.

We greatly appreciate the contribution made by all our funding partners and would like to thank our donors for their crucial support. It contributes to improved livelihoods in West and Central Africa through sustainable increases in agricultural productivity and production, as well promotes competitiveness in markets.

A big thank you to all stakeholders for believing in us to deliver on our commitments. Your contributions to our coordination and facilitation efforts are invaluable in consolidating our institutional mandate in WCA.
Annex 1: Some Scientific publications


### Annex 1: Some Scientific publications


Annex 2: Some Articles published on the CORAF website

1. Turning West African Cotton Stems to Profitable Business
2. ‘Alliance Sahel’ Injects New Momentum in Scientific Cooperation
3. Cashew Creations for Women’s Employment in Senegal
4. As Niger Scales up E-vouchers, More Farmers have Access to Agri-inputs
5. Private Sector Growth Real Measure of Seed Regulation Success
6. West Africa Assesses Progress in Implementation of Seed Regulation
7. Slow Millet Productivity Pose Fresh Challenges to Researchers
8. The Man Championing Wassachiè, Mali’s ‘Favored’ Chicken Specie
9. Meet the ‘Next Generation’ of West African Agric Scientists
10. How’s Niger’s Livestock Faring in Mali
11. Off-Season Rice Fends off Malian Farmers from Climate Stress
12. The "New Scientists" Re-energizing Livestock Research in Niger

Annex 3: Some Success stories with lessons for future projects

1. Cashew Creations for Women’s Employment in Senegal
2. As Niger Scales up E-vouchers, More Farmers have Access to Agri-inputs
3. Private Sector Growth Real Measure of Seed Regulation Success
4. West Africa Assesses Progress in Implementation of Seed Regulation
5. Slow Millet Productivity Pose Fresh Challenges to Researchers
6. Progress Made on Cashew Yields in Benin
7. SRI is Increasing Farmer’s Incomes in Mali
8. New Cassava Varieties Changing Women’s Lives in Cote d’Ivoire
9. The Dry Cereals Research Hub Upgraded
Annex 3: Some Success stories with lessons for future projects

10. “WAAPP-TAAT Collaboration Can Rapidly Transform Agriculture,” IITA official

11. WAAPP Made Substantial Contribution to West Africa Research, report

12. Young Guinean Takes a Successful Bet in Agriculture

13. Benin Relies on WAAPP to Increase Agri Production

14. The Thriving Goat and Guinea Fowl Business In West Africa

15. New Program Seeks Lasting Changes in Agriculture System of West and Central Africa

16. WAAPP Offers 25 New Scholarships to Young Guineans

17. CORAF Joins New Global Research Program on Grain Legumes and Dryland Cereals

18. E-vouchers to facilitate Agri-inputs Access in Guinea
### Annex 3: Some Success stories with lessons for future projects

<table>
<thead>
<tr>
<th>Nom</th>
<th>Spécialité/Institution</th>
<th>Pays</th>
</tr>
</thead>
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<td>Cameroon</td>
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<tr>
<td>Dr. Rachidatou SIKIROU</td>
<td>Défense des cultures</td>
<td>Bénin</td>
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<tr>
<td>Dr. Aïssétou Dramé-Yayé</td>
<td>Agro-foresterie</td>
<td>Niger</td>
</tr>
<tr>
<td>Name</td>
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<td>Organization/Role</td>
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</tr>
<tr>
<td>Dr Angela María P. Baretto Da Veiga MORENO</td>
<td>NARS - Cape Verdo INPA Board Chair</td>
<td>Member of the Governing Board of CORAF</td>
</tr>
<tr>
<td>Mr Oumar Chaib HASSANTY</td>
<td>NARS - ITRAD Chad</td>
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<tr>
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<td>NARS - Mauritanie, CNRADA</td>
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<tr>
<td>Dr Yte WONGBE</td>
<td>NARS - CNRA Côte d'Ivoire</td>
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<tr>
<td>Prof Daniel Franck IDIATA</td>
<td>NARS - CENARST Gabon, Commissaire Général</td>
<td>Member, Chair Nomination &amp; Governance Committee</td>
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<tr>
<td>Prof Victor AGYEMAN</td>
<td>NARS - Ghana CSIR</td>
<td>Member</td>
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<tr>
<td>Dr Alfred DIXON</td>
<td>Scientific &amp; Technical Partners - IITA, Sierra Leone</td>
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<tr>
<td>Mr Abdrahamane DICKO</td>
<td>Development Partners (Donors), USAID regional, Accra,</td>
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<tr>
<td>Mr Sekou SANGARE</td>
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<tr>
<td>Dr Blessed OKOLE</td>
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</tr>
<tr>
<td>Mr Nathanael MUPUNGU BUKA</td>
<td>Farmer Organizations (PROPAC), RDC</td>
<td>Member</td>
</tr>
<tr>
<td>Mrs Irié Lou Irié Colette (FENASCOVICI)</td>
<td>Non-Governmental Organizations</td>
<td>Member</td>
</tr>
<tr>
<td>Dr Abdou TENKOUANO</td>
<td>Ex-Officio</td>
<td>Board Secretary</td>
</tr>
</tbody>
</table>

**Observers**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization/Role</th>
</tr>
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<tbody>
<tr>
<td>Dr Seyni HAMADOU</td>
<td>Regional Economic Commissions (UEMOA)</td>
<td>Observer, Representing UEMOA</td>
</tr>
<tr>
<td>Mme ADA NLANG Hanicia</td>
<td>Regional Economic Commissions (CEMAC)</td>
<td>Observer Representing CEMAC</td>
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<tr>
<td>Dr Yemi AKINBAMIJO</td>
<td>Executive Director FARA</td>
<td>Observer, Representing FARA</td>
</tr>
<tr>
<td>Prof. Saliou NDIAYE</td>
<td>Chair ANAFE (University of Thiès)</td>
<td>Observer, Representing Tertiary Education Institutions</td>
</tr>
<tr>
<td>M. Abdoulaye TOURE</td>
<td>TTL, WAATP/WAAPP</td>
<td>Observer, Representing World Bank</td>
</tr>
<tr>
<td>M. Boubacar KANOUTE</td>
<td>Programme Officer, EU</td>
<td>Observer Representing European Union</td>
</tr>
</tbody>
</table>
Fish ponds in Monai village, Niger State, Nigeria: Before 2008, culturing fish was almost foreign to the people of Monai. When WAAPP was introduced in Nigeria in 2008, inhabitants of Monai were trained in fish farming, integrated aquaculture, and new ways of producing quality fingerlings. Today, thousands of youths and families have either joined fish farming or expanded their farms and as a result, increasing their incomes and livelihoods.