

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



**West and Central African
Countries for Agricultural
Research and Development**

**REGIONAL STRATEGY
FOR PLANT GENETIC RESOURCES MANAGEMENT
IN WEST AND CENTRAL AFRICA**

September, 2007

Disclaimer

This document has been developed by the regional plant genetic resources network in West and Central Africa GRENEWECA of the West and Central African Council for Agricultural Research and Development (WECARD/CORAF).

The objective of this Strategy is to provide a framework for the efficient and effective ex situ conservation of the most important crop diversity collections in the West and Central Africa region, and to promote the availability of these plant genetic resources for food and agriculture.

The Global Crop Diversity Trust (the Trust) provided support towards this initiative and considers the document, particularly those portions pertaining directly to the Trust's mandated areas of interest, to be an important input to the Trust's own planning and work. We expect the Strategy to continue to evolve, as appropriate, and for the Network to lead this on-going process.

The Regional Strategy is the strategy of the region. The Trust does not take responsibility for its contents or for the accuracy or completeness of the information contained in the document. Please direct specific questions and comments to GRENEWECA/CORAF.

Global Crop Diversity Trust
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1. Introduction

West and Central Africa is endowed with a diversified physical environment. Rainfall ranges from zero in the Sahara desert to more than 1,500 mm annually in the South in the forest belt with an excess of 3,000 mm at the coast from Guinea to Liberia and around Mount Cameroon. Vegetation includes dense forest on the southern guinean zone, savannahs in the soudanian and sahelian zones and desert in the sahara. There are also many specific vegetation patterns such as mangroves on the coastal zones, swamps forests, oasis forests, mountain forests, etc.

There is parallel diversity in the vegetation and crop adaptation and the region can be divided into three major agro-ecological zones each characterized by particular dominant crops:

- The Sahel with its livestock and crop livestock systems: the latter based on millet or sorghum with rice as staple for the Niger inland delta region.
- The coastal and savanna zone with mixed livestock and cropping: where maize, sorghum, rice, cassava or yam are dominant crops.
- The humid forest zone: where roots, tubers and tree crops have higher relative importance, although the major crops are largely the same as those of the savanna zone.

This diversified environment shelters a great diversity of indigenous crops, wild relatives and forest species which are important in farming and nutrition, medicine and, local cultural practices. West and Central Africa is center of diversity for a range of crops such as pearl millet, sorghum, African rice, fonio, cowpea, bambara groundnut, African oil palm, coffee and African yams.

Despite their great importance for nutrition, household economy, health and cultural practices for West and Central African local communities, several of these plant species have been neglected by science and development and are badly managed. Their diversity is getting eroded through changes in land use and farming systems and change of dietary habits, among other reasons.

In the region, there is also a lack of adequate information on the importance and distribution of diversity of local germplasm, poor mechanism for information sharing among stakeholders, insufficient number of trained people in genetic diversity conservation, and lack of appropriate policy models that support the conservation and sustainable use of these resources. All these factors impede the proper and sustainable use of genetic resources in the sub-region. The situation has been exacerbated by the severe droughts of the late 1960's and early 1970's that led to the loss of the germplasm of many cultivars exclusively maintained by local communities. This catastrophe has heightened awareness of

genetic erosion in the region's plants and drew attention to the urgent need to preserve this diversity, which is vital to sustainable agricultural production in the sub region.

Since the early seventies, numerous prospecting and plant collecting missions have been organized by international organizations such as FAO, IBPGR/ IPGRI and other international and regional research centers like IITA, ICRISAT, ILRI, CIRAD, ORSTOM, WARDA and KIT, in collaboration with national programs of the region. Collected samples were generally shared among the countries visited and the international research institutions. A number of countries have also undertaken additional collecting missions and established national gene banks for conservation of the collected material. Unfortunately, most of the materials conserved at national level are lost today because of poor gene banking capacities both in terms of physical and human resources in most countries in the sub-region, Only very few of them are able to make significant commitments towards supporting research, conservation and use of genetic resources.

As a consequence, despite their rich crop diversity, most of the West and Central Africans countries are facing enormous difficulties in meeting the needs of their populations in terms of foods and health.

2. Major trends with significance for genetic diversity conservation and use in West and Central Africa

Several factors affect genetic diversity conservation and use in West and Central Africa. Some of these are outlined briefly below.

2.1. Rapid population growth

According to estimations, the population in West and Central Africa will triple by the early decades of the 21st century (see graph 1). Nigeria stands apart with a population of about 120 million, occupying an area of 900,000km². Among the other twenty-three countries only Ghana, Cameroon and Côte d'Ivoire have populations in excess of 10 million and the fourteen other countries have less than 8 million people. Population grows at 2 to 3% rate per year for countries in this sub region. This high rate is likely to continue (See projection for 2050) and will be accompanied by an increased pressure on agriculture and natural resources.

This could lead to:

- Increased land clearing and deforestation that could threaten genetic diversity and lead to species loss,

- Increased focus on high yielding crops and abandonment of lower yielding indigenous crops narrowing of genetic resource base for agriculture.

Hunger and malnutrition threaten millions of people in the West and Central Africa region. Many countries in this region have about 20% or more of their people living under food insecurity. The problem is more crucial in the arid regions, such as the Sahel, where drought threatens most rain-fed cultures. The food shortage and also the growing pandemic of HIV/AIDS in the region will negatively affect human health and labor availability for agriculture and other jobs. The search for remedies and cures for HIV/AIDS-related conditions will continue. The exploitation of plant genetic resources will be an integral part of this search. Emphasis on plant to solve problems will continue and will include:

- Promotion of indigenous plant species with high nutritional value, e.g. the African leafy vegetables, fruits, fonio, etc.
- Increase use of medicinal plants.

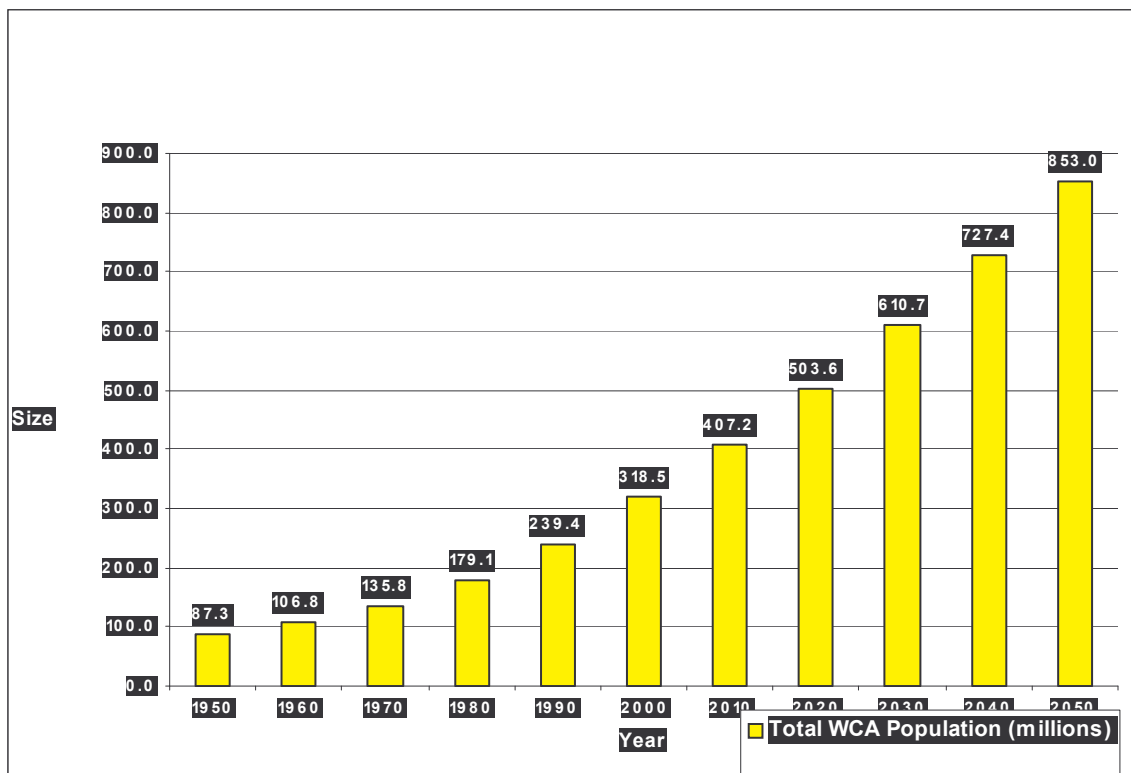


Figure 1: Predicted trends in West Africa population growth

2.2 Effect of climate change

Today, an increasingly unstable climate is contributing to the accelerating loss of species and genes on a global scale. Global warming and greenhouse gasses phenomena, among others, are changing the environment in which plants and other living organisms live and grow. In the West Africa region this is vividly experienced and observed through the downward drift of the effects of the Sahara Desert. The problem is more acute in the drier environments where certain varieties of crops are grown near their limits of minimum rainfall requirement. This is impacting on local agriculture, and therefore affecting the region's food supply and mechanisms of plant genetic resources conservation.

Changing climates could affect genetic diversity in species and gene pools, with some species disappearing completely, especially in the drier environments.

2.3 Scientific and technical environment

For most countries in West and Central Africa, the national research and development systems are in an early stage of evolution, and have limited manpower and financial resources. Component of plant genetic resources conservation within these systems either does not exist or if any at embryonic stage. National plant genetic resources programmes in most countries in the sub-region are weak, and lack basic conservation and evaluation facilities, as well as human resources. Networking is therefore recognized as an essential mechanism for supporting country efforts for better management of their genetic resources. It has the vocation of bringing members together in such a way that all partners contribute and benefit from the network and that the efficiency in reaching the common goal is higher than if members had attempted to reach it individually.

Several international research institutions are working in collaboration with countries of West and Central Africa on PGR management to overcome food insecurity and to achieve for well-being of local communities. The headquarters of the International Institute of Tropical Agriculture (IITA), the West Africa Rice Development Association (WARDA) are located in the sub-region. The Sahelian Center of ICRISAT, and regional programmes and offices for CIP, ILRI and Bioversity International are also present and very active in the sub-region. The sub-region benefits from its technical and scientific partnership with these institutes to strengthen its research capacities: training of scientists, development of research tools and technologies. Additionally access to germplasm conserved in international and regional collections by the various international agricultural research institutions (IARCs) is facilitated.

However, most international institutions generally focus actions on major commodities, their mandate crops and many other species of importance to local communities are left out. It is therefore only through strong national PGR programmes that this large variety of species will be taken care of,

2.4 International and political factors

At the global level, the adoption of the Convention on Biological Diversity (CBD), the Global Plan of Action for plant genetic resources for food and agriculture (GPA), the entry into force of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) and the creation of the Global Crop Diversity Trust (The trust) set a conducive technical and political environment that is favorable to preservation of plant genetic resources. In Africa, the problem of conservation and use of plant genetic resources is crucial. The growing interest of the African Union (AU) for this is clearly stated in its Model Law on plant genetic resources management, initiated to provide a framework to guide African countries for the development of national policies.

In spite of this, Africa in general and West and Central Africa in particular is still lagging behind in the agro biodiversity management. Individual country's efforts to achieve progress in this area are limited. Therefore a variety of regional initiatives call for appropriate mechanisms for collaboration and cooperation among countries for concerted efforts and actions for the take off of the sub-region agricultural development:

- The New Partnership for Africa Development (NEPAD)
- The Forum for African Agriculture Research (FARA)
- Adoption of the Comprehensive Africa Agricultural Development (CAADP)
- Adoption of West Africa Agricultural Productivity Programme (WAAP)
- Adoption of Central Africa Agricultural Programme (CAAP)
- Development of policies for various sectors (Forest, Fisheries, Fertilizers etc) by the Economic Commission of West African States (ECOWAS)
- Development of Regional Agricultural Investment Programmes in WCA (RAIP)
- Development of new strategy for the Council of West and central Africa Research and Development (WECARD/CORAF)
- Etc.

All these organizations and initiatives recognized the importance of the promotion, conservation and sustainable use of existing plant genetic resources for agricultural development for the well-being of present and future generations.

2.5 Regional Collaboration on PGR conservation and use in West and central Africa

The task of promoting the conservation and use of plant genetic resources in West and Central Africa, as well as that of enhancing awareness of their importance and value, are major ones. This is the core mission of the Genetic Resources Network for West and Central Africa (GRENEWCA/ROCAREG) established in February 1998. This network covers twenty four countries among

which speaking diverse languages: French (15 countries);, English (4 countries), Portuguese (4 countries) and Spanish (1 country).

To encourage, support and undertake activities to improve the management of genetic resources in West and Central Africa so as to help eradicate poverty, increase food security and protect the environment, GRENEWECA focuses on the conservation and use of genetic resources important to countries of the sub-region. GRENEWECA's mission is also to assist national programmes on plant genetic resources to be actively engaged in adoption and implementation of international conventions and laws: Convention on Biological Diversity (CBD), GPA, and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)

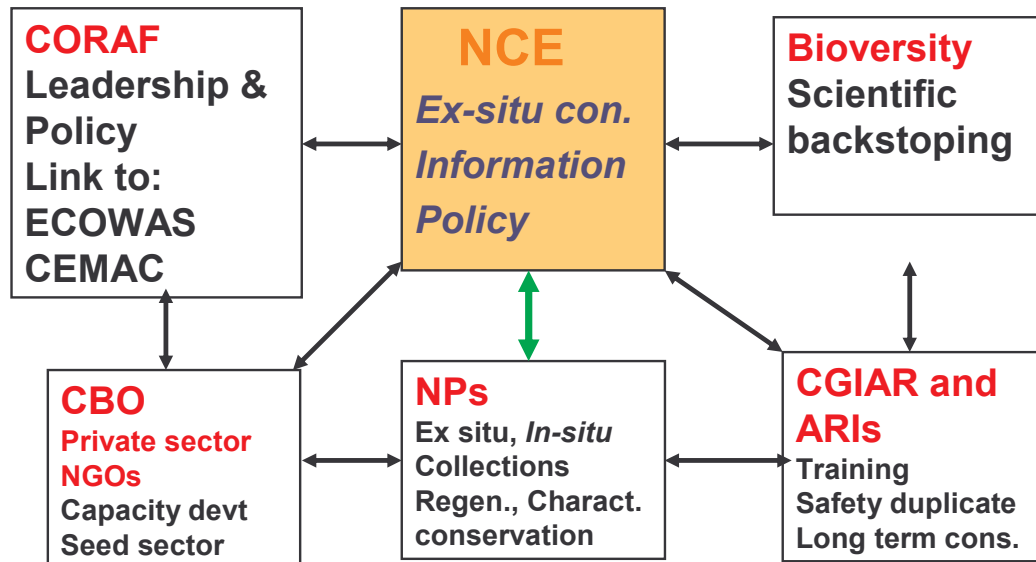
To achieve this, Members of GRENEWECA, CG Centres, Partners from Developed Countries, The Global Crop Diversity Trust at the Regional Conference organized by CORAF in Ibadan, Nigeria 26-30 April 2004 recommended strong regional collaboration and cooperation mechanism using the Nodal Central of Excellence Approach (NCE). This initiative is endorsed by CORAF's Executive Council which recommended the Secretariat to further develop the concept. A consultant was commissioned by CORAF and the Trust who surveyed existing national capacities in WCA and proposed major actions to be taken to establish effective cooperation on PGR management in the sub-region. At the second Regional Conference held in Ouagadougou, Burkina Faso 11-15 September 2006 the Nodal Centre of Excellence (NCE) mechanism was adopted.

The Nodal Center of Excellence (NCE) is a regional mechanism that brings together NARs, CG Centres and other partners to share responsibilities in PGR conservation and enhancement. NCEs are created under CORAF/WECARD and collaborate with the CG Centres, the Genetic Units of Advanced research Institutes, Private sector and NGOs (See Fig 1). They are located in countries but could also be based in regional or international research centres on the basis of comparative advantages.

Four NCE have been approved:

1. NCE on Cereals crops (Pearl Millet, African Rice, Sorghum, Fonio etc) in the Sahelian zone
2. NCE on Root and tuber crops (African yams, frafra potato, cocoyam) in Coastal West Africa
3. NCE on Banana and Plantain in Central Africa
4. NCE on Coconut collection in Coastal West Africa

Links to Partners



3. Nodal Centres of Excellence to Conserve and Enhance WCA PGR Collections

3.1 Goal of the NCEs

Plant genetic Resources of West and Central Africa are effectively collected, characterized, conserved and sustainably used for the well-being of the people of the sub region through a network of strong National Programmes.

3.2 Objectives of the NCEs

1. To take responsibilities on behalf of countries for effective ex situ conservation of the sub-region's plant genetic resources
2. Develop/strengthen national capacities in plant genetic resources development.
3. Promote awareness on policy issues of relevance to PGR management and develop/strengthen national capacities in laws and legislation
4. Develop regional PGR documentation system and information sharing mechanism.

3.3 Activities of NCEs

Objective 1: Take responsibilities on behalf of the countries in WCA for effective conservation of the sub-region's plant genetic resources

This includes:

- To conduct on behalf of all the countries in the region the medium-term *ex situ* conservation of specific mandate crops and ensure their safety duplication in an international centre
- Developing conservation management standards including seed health monitoring system to address pathogen detection and germplasm sanitation.

Objective 2. Strengthening national capacities in plant genetic resources development

Main activities for this objective will include:

- Assisting countries in managing their *in situ* collections and enhancing complementarities between *ex situ* and *in situ* collections.
- Understanding genetic diversity in *in situ* conservation systems.
- Investigating gene flow between cultivated and wild relatives species.
- Undertaking gap filling collections and preserving threatened species.
- Training national scientists and technicians in *ex situ* gene bank management.
- Promoting the publication of PGR research and development activities and results.

Objective 3. Promote awareness on policy issues of relevance to PGR management and develop/strengthen national capacities in laws and legislation

The following activities will be undertaken:

- Training activities of national programmes on law and policies related to PGR,
- Promote and facilitate PGR policy development and analyses.

Objective 4. Develop regional PGR documentation system and information sharing mechanism

This will be achieved by

- Development of a regional information system providing access to the information on materials conserved at the NCEs
- Promoting the use of appropriate software and data management systems for PGR in national programmes.
- Sharing of information among members through newsletters and other media.

4. The Governance of the Nodal Centre of Excellence

Under the auspices of CORAF the Nodal Centres of Excellence are governed by the Genetic Resources Network for West and Central Africa (GRENEWECA). The Governance of GRENEWECA is made of a General Assembly, a Steering Committee, a Secretariat and the Coordinators of the NCEs. Composition and attributions of the organs are as are as follows:

4.1 The General Assembly

The General Assembly is the Consultative body of the network.

Composition:

It is composed with:

- CORAF Secretariat (3)
- All member countries (24)
- Representatives of CG Centres operating in WCA (6)
- Representatives of Advanced Research Centres present in WCA (5)
- Regional and International NGOs involved in genetic resources management in WCA (2)
- Representatives of Donors

Mandate;

The Assembly meets every four years in plenary session. Extraordinary sessions could be held upon request by the Secretariat and approval of the Chairman.

The General Assembly examines and makes suggestions on issues affecting genetic resources conservation and use in West and Central Africa. It provides guidelines and orientation for the network activities.

4.2 Executive Committee of GRENEWECA

The Executive Committee of GRENEWECA is the supreme executive organ of the network.

Composition

It is composed with:

- Representative of CORAF Secretariat (1)
- Three Representatives of NPs (one per agro ecological zones of CORAF) elected for 3 years, renewable once (3)
- One Representative of CG Centre (1)
- One Representative of ARI (1)
- Coordinators of NCEs (4)
- Coordinator of GRENEWECA (1)

Mandate

The Committee meets every two years to:

- Examine and approve progress made and the bi-annual work plans and budgets of the NCEs.
- Examine and approve annual reports of the Secretariat
- Examine and approve work plan and budgets for the Secretariat
- Approve any initiatives that engage GRENEWECA
- Raise funds for the network activities;
- The Chairman and the Coordinator represent the network in legal negotiations and at important international fora relevant to genetic resources;

Chairperson of GRENEWECA Steering Committee

The Steering Committee is chaired by CORAF Executive Secretary or his/her Representative.

The functions of the Chairperson

1. To chair the Steering Committee meetings,
2. To participate in the CORAF network co-ordination meetings as may be necessary.
3. To report to the Executive Council of CORAF.

4.3 Secretariat of GRENEWECA

The Secretariat is hosted by a national or international research institution based on comparative advantages. It is headed by a Coordinator. It reports to the Steering Committee and CORAF.

Secretariat Composition

It is composed with the Coordinator assisted by few support staff (Administrative and Finance Assistant, Scientific Assistant and Driver).

Responsibilities of the Coordinator

The coordinator:

1. Serves as secretary of the Steering Committee.
2. Provides overall co-ordination of GRENEWECA and NCEs' activities through close consultation with CORAF and the Hosting Institutions,
2. Prepares all technical and financial documents to be examined by the Steering Committee,
3. Facilitates the necessary logistical and technical support to national genetic resources programmes and other stakeholders in the implementation of the NCE's,
4. Contributes to fund raising activities with the Steering Committee to secure funds for the NCEs' operations.
5. Contributes to publication of the Network and NCEs' results through GR documentation, public awareness and information services,

6. Provides scientific support in establishment and strengthening regional and international collaboration and networking activities,
7. Liaises with networks and specialized group leaders to develop and ensure harmonization of GR activities
8. Initiates and develops human resources and capacity building for national programmes in the sub-region,

4.4 Coordination of Nodal Centre of Excellence

Each Nodal centre of Excellence is coordinated by a Coordinator assisted by the administrative staff of the hosting institution.

5. Modus operandi of the Nodal Centres of Excellence

The operational strategy of the Nodal Centre of Excellence is based on partnership. All its activities are implemented in collaboration with national, regional and international partners.

5.1 Partnership with National Programs

It is worldwide recognized that genetic resources belong to the nations who develop, control and use them. National genetic resources programmes are responsible for ensuring that they are well preserved and sustainably used.

A national program is a type of network of all stakeholders involved in the conservation and use of the genetic resources at national level. It comprises national agricultural research institutions, universities, forestry departments, livestock departments, healers, NGOs, private sector, education institutions, various ministries responsible for environment management, agriculture, trade, legislation, health etc. This large group of people is generally very active individually but do ignore what others are doing. This situation ineluctably leads to waste of energy, waste of limited resources (human and finance) and inefficiency. No clear mandate is given to any institution for conserving specific collections and many germplasm collections are simply lost or abandoned if the holding institutions lack resources or change mandate. There is an urgent need to establish at national level an adapted mechanism for exchange of ideas and experiences for better management of the genetic resources. This calls for forum where all the stakeholders can meet and evaluate the country's potential in genetic resources, activities undertaken by various institutions, existing gaps and plan for urgent actions.

To be strong enough, national programs should have clear mandate recognized by the all partners and policy/decision makers. It should develop and adopt its strategic and action plans compatible with and linked to national policy (for natural resources management) and national development plan. It should also

maintain good working relationships with all other institutions contributing to the development of the sector especially the CG Centres, FAO and various international Commissions, Conventions and treaties (CBD, CCC, CD, ITPGRFA etc) in a regional collaboration mechanism.

In this context National PGR Programmes will duplicate of their collections to NCE for medium to long term conservation. Responsibilities for characterization and evaluation of the collections rest with the National PGR Programme unless a special arrangement is made for the NCE to assist in its characterization and evaluation. The materials conserved belong to the country and can be retrieved at any moment provided a request is sent to the NCE in time. The NCE can provide samples of species of Annex 1 of the International Treaty for PGRFA with other partners using the treaty. Appropriate mechanism developed and adopted by the countries will be used for exchange of non annex 1 species. .

5.2 Partnership with Networks

The NCE will collaborate with all networks involved in PGR management. The collaboration can be based on exchange of material, training researchers, joint exploration, collection of germplasm, or undertaking germplasm characterization.

5.3 Partnership with CG Centers

CG Centers operating in West and Central Africa (Bioversity International, IITA, WARDA, ICRISAT, ILRI) play important roles in exploring, collecting, conserving and characterizing the germplasm of important plant species of the sub-region. The gene banks at IITA and WARDA provide important security storage, close at hand, for some of the region's major crops. ICRISAT also provide valuable services to the region's sorghum, millet and groundnut breeders' by holding duplicate samples and collection and characterization data of their varieties in its global collections at the Sahelian Center at Sadore in Niger. Bioversity's global expertise on Agro biodiversity will benefit the NCE in the area of:

- Investigation, documentation and promotion of traditional plant species,
- Development of best practices of gene bank management in WCA,
- Information sharing and documentation system,
- Implementation of GPA, CP and System Wide Ecoregional Programmes,
- Policy analyses and development.

The NCE will play a facilitating role in assisting national programs to keep their germplasm collection in the CG gene banks using black boxes arrangements. A thorough characterization of the germplasm collections is needed to fully benefit from the genetic resources available in the sub-region. NCE will benefit from biotechnology facilities available in CG Centers to undertake genetic characterization and genetic diversity enhancement of the collections.

Recent survey conducted by CORAF's Consultant has indicated that fairly well structured tissue culture laboratories exist in most of the countries. These laboratories are generally lacking in basic equipment, well-trained scientists and consumable to become operational. International research centres and Donors will assist to strengthen some of these Laboratories to play regional roles in the context of the NCE approach to benefit other countries in the sub-region.

5.4 Partnership with Research Institutions of advanced countries

Research Institutions of developed countries such as CIRAD, IRD, KIT, GTZ etc have greatly contributed to exploration, collecting, characterization, evaluation, conservation and use of the plant genetic resources for the benefit of people from sub-region. The NCE will maintain and develop strong relationships with these partners (on the basis of case per case) through joint research and training programmes.

5.5 Partnership with International NGOs and private Firms

Non-Governmental Organizations are very active in assisting farmers in developing and sustainably use of their genetic resources (ACAS, USC Canada in Mali, GRAIN in WCA). This valuable assistance will be further developed in various domains such as *in situ* and on-farm conservation, training and utilization of the genetic resources. Many international firms are also very active in use of genetic resources through biotechnology. Specific agreement including these partners, National Programs and GRENEWECA will be negotiated based on existing legislations at national, regional and international levels.

5.6 Partnership with International Organization

GRENEWECA has been created for the implementation of the GPA adopted in Leipzig in 1996 at the FAO International Technical Conference on Plant Genetic Resources. The implementation of this plan is guided and monitored by the Commission on Genetic Resources for food and agriculture of FAO. GRENEWECA will work in close relation with FAO and Bioversity International for the implementation of the plan. Regular consultations will be organized to benefit from FAO experiences and expertise. Indicators developed by FAO and Bioversity International will be used to evaluate progress made in the implementation of the plan in WCA.

6. Funding NCE activities

Collections maintained at the NCE will be supported by contributions from the countries, subsidies, grants and donations.

In the framework of its mandate in West and Central Africa, CORAF will develop special projects to strengthen capacities of National Centres selected to host

NCEs; ECOWAS and CEMAC will be approached in this context. The Coordination of NCE is ensured by GRENEWECA's Secretariat based at CORAF which will provide its regular functioning. The Network will raise financial resources for the operation of the NCE through projects. Special supports will be requested from the Global Crop Diversity Trust (The Trust) to cater for the long term conservation of some collections of global importance such as the African Yam, Coconut, Bananas, African Millets, African Rice collections etc. In order to support the Network, participating National Programs and Regional and International Organizations will also provide contributions to the Network in various forms. The Network can receive grants and donations from Private organizations and any other donors, for the conduct of its activities provided that these are not contrary to the missions assigned by the founding members.

List of acronyms

AU : African Union
CAADP : Comprehensive Africa Agriculture Development Programme
CBD : Convention on Biological Diversity
CG: Consultative Group for International Agricultural research
CIP : International Potato Center
CIRAD: Centre de Coopération Internationale en Recherche Agronomique pour le Développement.
ECOWAS: Economic Community of West Africa States
FAO, : Food and Agriculture Organization
FARA : Forum Africain Pour la Recherche Agricole
HIV/AIDS: Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome
IARC: International Agricultural Research Centre
IBPGR: International Board for Plant Genetic Resources
ICRISAT: International Crop Research Institute for Semi Arid Tropics
IITA: International Institute for Tropical Agriculture
ILRI: International Law Research Institute
IPGRI: International Plant Genetic Resources
ITPGRFA : International Treaty on Plant Genetic Resources for Food and Agriculture
KIT: Royal Tropical Institute
NARS: National Agricultural Research System
NCE: Nodal Centre of Excellence
NEPAD: New Partnership for Africa Development
NGO: Non Gouvernemental Organisation
ORSTOM/IRD: Office de la Recherche Scientifique et Technique d'Outre-Mer/ Institut de Recherche pour le Développement
PGR: Plant Genetic Resources
RAIP: Regional Agricultural Investment Programme
WAAP: West Africa Agricultural Development Programme
WARDA: Africa Rice Center/West Africa Rice Development Association
WECARD/CORAF: West and Central African Council for Agricultural Research and Development/Conseil Ouest et Centre Africain pour la Recherche et le Développement Agricole