

3. West Africa's preparedness level: current situation and measures envisaged

3.1 Current situation

The review of the state of knowledge on the impacts of climate variability and change in West Africa, in the preceding chapter, highlights the great vulnerability of the region. If the trends observed over the last three decades were to remain or become aggravated, the environmental and socio-economic impacts could be enormous for West Africa, unless necessary steps were taken in time to lessen the shocks.

West Africa, and the Sahel in particular, has been facing drought since the sixties, with the serious food crisis of 1972 in particular, which resulted in major changes in the natural environment and the livelihood of the communities. In response to this situation, a great number of initiatives were carried out or are underway.

3.1.1 At a regional level

CILSS. Probably the most significant of these initiatives was the creation, in 1974, of the Permanent Interstate Committee for Drought Control in the Sahel (CILSS). CILSS comprises 9 countries (Mauritania, Senegal, Cape Verde, Guinea Bissau, The Gambia, Mali, Burkina Faso, Niger and Chad). Since its creation, CILSS has carried out a broad range of activities, particularly in the following fields: (a) the collection and management of data on climate, hydrology, soils, and on certain socio-economic aspects; (b) the dissemination of climatic information to Member States and other target groups; (c) the setting up of an early warning system based on weather data, agro-ecosystem models and geographical information systems; (d) research and training, through its AGRHYMET Regional Centre (Regional Centre for Training and the Application of Agrometeorology and Operational Hydrology). All these actions contribute to the attainment of food security, a better management of natural resources and poverty alleviation.

The AGRHYMET Regional Centre runs a project entitled "Strengthening the Capacities of the CILSS Member States to Adapt to Climate Change in the Sahel". This project is funded by the Government of Canada. Studies on the assessment of climate change impacts will be carried out for sectors such as water, pastoralism, land degradation, and food production. Adaptation strategies will be proposed in order to face the variations related to climate change. Pilot activities are implemented within the framework of this project in close cooperation with the communities, in order to make an inventory and evaluate indigenous knowledge with respect to adaptation to climate variability.

It is worth noting that CILSS prepared a Sub-Regional Action Programme on Desertification Control including eight topics. One of them deals with transboundary water. Its group leader is OMVS.

The PRESAO Initiative. The PRESAO Initiative (Seasonal Forecast for West Africa) was launched in 1998 by a consortium including particularly the African Centre of Meteorological Applications for Development (ACMAD), the AGRHYMET Regional Centre and the Niger Basin Authority (NBA). PRESAO aims to build capacity in the

field of seasonal climate forecasting. Within this framework, at the onset of each rainy season, PRESAO issues a forecast on the probable rainfall conditions for the whole sub-region (ACMAD/WMO, 1998). Since 1999, the seasonal flow forecast of major rivers of the sub-region has been added to the activities of PRESAO (ACMAD/WMO, 1999).

HYCOS-AOC. Since January 2000, the NBA and AGRHYMET have been carrying out the pilot phase of HYCOS-AOC, which is the West and Central Africa Component of the World Hydrological Cycle Observing System (WHYCOS) of WMO (WMO/MAE, 1997). It covers eleven countries. The objective of the HYCOS-AOC project is to create an information system on surface water resources by setting up a mechanism of data collection and transmission, providing real time, or near-real time, information on the availability of surface water resources in the sub region. The relevance of such a mechanism consists of contributing to a better management of water resources, exchange of information among countries sharing the same catchment area and providing warnings in the event of floods and/or deficient flow. Funds are being collected for the extension of the project to all the countries of the sub-region through a basin approach (Niger-HYCOS, Volta/HYCOS, Senegal/HYCOS, Lake Chad HYCOS) for a period of at least five years. The project documents for Niger-HYCOS and Volta-HYCOS are the most advanced ones.

FRIEND-AOC. This is the component of the FRIEND project (Flow Regimes with International and Experimental Network Data) for West and Central Africa, which is a component of UNESCO's IHP (International Hydrological Programme), another initiative related to the hydrological cycle. The main objective is the promotion of scientific research into water cycles through the creation of a network of scientists working in the field (UNESCO, 2002). It aims at increasing knowledge of spatial and temporal variability of rainfall and hydrological regimes by using regional datasets and placing this variability in its historical context. It contributes to improving our knowledge of the sub-region's hydrological cycle and its impacts. This is based on the sharing of a sub-regional hydro-climatological database to meet the needs of the researchers within the network, the organization of scientific workshops and training support. The AGRHYMET Regional Centre coordinates this project.

AIACC. The AIACC Programme (Assessment of Impacts and Adaptation to Climate Change), launched in February 2002, is an initiative of the IPCC (Intergovernmental Panel on Climate Change) financed mainly by GEF (Global Environment Facility). Its objective is to advance research on climate change in the developing countries by putting a particular emphasis on adaptation. This programme finances projects at a sub-regional level in general and provides, in addition to financial assistance, technical aid and training. The programme is implemented by UNEP and is jointly carried out by START and TWAS. Altogether 23 projects have been accepted to date, including 12 for Africa. Among these projects, four are of particular interest for West Africa: (a) the project for the development of regional scenarios of climate change in West Africa (Project AF07); (b) the project for the assessment of global and regional scenarios of climate change for West Africa (Project AF20); (c) the food security and climate change project in sub-Saharan Africa (Project AF23); (d) capacity building in analytical tools

for estimating and comparing costs and benefits of adaptation projects in Africa (AF47).¹

AMMA. The AMMA Programme (Multi-Disciplinary Analysis of the African Monsoon and its Impacts) is an international research programme, which is being implemented by the international scientific community. The two main aims of the AMMA programme consist of: (a) improving the understanding of the WAM (West African Monsoon) and its influence on the physical and chemical environment and on the biosphere at regional and global levels; (b) generating knowledge that would enable relationships to be established between climate variability and health, water resources and food security issues in West African countries and appropriate monitoring strategies to be formulated.

3.1.2 At a national level

Responses implemented at a national level include:

National communications. To date, 11 countries out of the 17 considered as part of the Dialogue on Water and Climate Change have presented their initial national communications to the United Nations Framework Convention on Climate Change. These communications were presented between 1997 and 2002 (see Table 5 below).

Table 5. Date of submission of initial national communications to the UNFCCC

Country	Date of submission
Benin	22-10-2002
Burkina Faso	16-05-2002
Cape Verde	13-11-2000
Côte d'Ivoire	02-02-2001
Guinea	28-10-2002
Mali	13-11-2000
Mauritania	30-07-2002
Niger	13-11-2000
Senegal	01-12-1997
Chad	29-10-2001
Togo	20-12-2001

Water control infrastructures. Significant investments were made in water infrastructure and irrigation schemes aimed at regulating water regimes in West Africa. Burkina Faso, for instance – a country located on the Precambrian basement with limited groundwater resources – has invested a lot in small water retention reservoirs. This country has constructed more than 1500 water retention reservoirs during the past three decades. Other countries of the region (Benin, Niger, Mali, Senegal) have followed suit. As mentioned earlier, the region currently has only 110 large dams, whereas countries such as the United States and China with similar surface areas have 6,000 and over 20,000 large dams respectively. India (one-third of the surface area of West Africa) has

¹ Website: www.start.org/Projects/AIACC_Project/aiaxx.html

more than 5,000 large dams. Yet, it should be pointed out that each country of the region has at least one large dam construction project that lies in the bottom of a drawer. On the Niger River alone, there are twenty large dam construction projects at an advanced planning stage. Overall and taking into account efforts aimed at promoting irrigation (5% of cultivated lands in Africa as compared to a global average of 17%), West Africa controls water poorly and remains therefore highly subject to the vagaries of the climate.

Artificial rains. This technique consists of encouraging rain to fall by seeding the clouds. It has been tested in Burkina Faso since 1999 in collaboration with Morocco. Unfortunately, this technique is cumbersome and costly, often with uncertain results.

Although there are various other initiatives that could be listed here, generally speaking, the most notable West African solutions to the recurrent drought and exacerbated climate variability affecting the region since three decades, consist mainly of research, that is data collection and to a lesser extent its analysis. This is very important though research efforts are still inadequate. In either case, significant reduction in the vulnerability of the region to climate variability and change require that research activities be supplemented by concrete adaptation measures in the field.

3.2 Measures envisaged in order to strengthen West Africa's preparedness and adaptation level

In their national communications prepared as part of the implementation of the United Nations Framework Convention on Climate Change, the countries of the region generally just identified a number of adaptation measures, which in many cases had neither been assessed economically nor prioritized.

With regard to adaptation measures proposed in the water resource sector, there is a certain convergence of proposals, which could be explained by the relatively homogeneous situations in the various countries, but also their common experience in drought control over the past three decades.

The major measures generally proposed are the following:

- a. *Promotion of Integrated Water Resource Management (IWRM).* In most national communications, this measure particularly aims at managing water at the level of drainage basins. It is recommended that basin organizations be strengthened in terms of institutional capacities, where they exist (OMVS, ABN, OMVG, etc.) and created where they do not (for example the Volta River). It should be noted that national communications do not clearly explain to what extent IWRM could contribute to reducing vulnerability to climate change in the countries concerned. Moreover, since the region's major watercourses are transboundary water resources, such a measure should be envisaged at national and interstate levels, and even at a regional level, with focus on river basins.
- b. *Enhancement of knowledge of water resources.* First and foremost, this measure concerns quantitative information (assessment of the availability of the resource and the variations it undergoes in time and space) but also qualitative data on surface and ground waters. In accordance with this measure, many communications advocate the extension and/or setting up of observation networks and increased support to research. It is clear that individual states can contribute significantly toward the implementation of this measure (support to research,



Wetland in Guinea Bissau, IUCN

strengthening of the data collection network). Yet, due to the aforementioned reasons (significant regional interdependence in the field of water), the effective and sustainable achievement of this measure requires co-ordination at basin or regional levels. In some river basins, (in particular those that do not have any basin organizations) riparian States have sometimes set up their own data collection and processing networks (using GIS for example) without any consultation with the other States. In some instances, information is held by one State without the knowledge of the others, thereby limiting its use.

- c. *Erosion and deterioration of water quality control by reforesting catchment areas.* As mentioned previously, the region's watercourses are subject to erosion, silting up and even water pollution (as in the middle reaches of the Niger River). Existing small and large water retention reservoirs are under threat of silting up by sedimentary deposits (it has been noted that small water retention reservoirs in Burkina Faso have experienced a significant decline in their capacity because of sedimentation).
- d. *Better legislation or implementation of legislations in force.* Many national communications have also proposed the actual enforcement of existing legal instruments in the management of the environment and natural resources, particularly the execution of national policies on water. The need for implementing international conventions on the environment (wetlands, biological diversity and desertification) is often underscored as an appropriate response to climate variability and change. In this respect, it should be recalled that all the countries of the region, with the exception of Cape Verde, have adhered to the Ramsar

Convention on Wetlands and that only Sierra Leone is not yet a party to the Convention on Biological Diversity.

The national communications have also come up with more specific adaptation measures with regard to climate variability and change in the sector of water resources. These include: (i) water transfer among basins; (ii) combined use of surface and ground waters; (iii) artificial recharge of aquifers; (iv) utilizing closed conduits in water supply systems; (v) dissemination of cost-efficient technologies and behaviours in the field of water, (vi) waste water recycling (domestic and industrial); (vii) sea water desalination; (viii) rain water harvesting; etc.

Some of the measures proposed for agriculture are also relevant for the water resource sector. These include: (a) constructing structures for harvesting runoff and rain water in order to prevent it from being lost and also to curb phenomena such as erosion and flooding, while enabling the recharge of aquifers; (b) better mastery of irrigation in order to render it more effective and cost-efficient; (c) strengthening early warning systems in the event of extreme events (droughts, floods) and agro-hydro-meteorological monitoring.

Finally, some national communications have underlined the dual role of some adaptation options, which could also help to sequester carbon (through afforestation and reforestation activities) and thus contribute to reducing greenhouse gas emissions.



Ziga Dam (Burkina) before the filling of the reservoir, Mahé

3.3 Conclusion

The West African countries are not prepared to face the adverse effects of climate change because the prerequisites for setting up an integrated system for combating these effects are not yet satisfied.

At a national level, inadequate collaboration and exchange of views among experts and institutions, lack of validated models specific to the Sahel and coastal areas in Africa

and poor financial commitment from States, constitute major handicaps in the formulation of a good response policy.

Solutions proposed by the States, as part of their national communications, are not always explained convincingly (economic justification, IWRM, etc.), which may be an indication of inadequate capacity. Some of the measures proposed are often technically, financially and/or politically unachievable at an individual country level. Many of these adaptation measures are relevant at a regional level only.

At a regional level, there are a number of research initiatives on the climate and water resources. However, the results of these research initiatives are poorly exploited in order to support decision-making aiming at contributing to enhancing the region's level of preparedness.