

# 1. Regional context

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West Africa is highly vulnerable to climate variability and change, which has to do with some of its physical and socio-economic characteristics.

The region covered by this strategy is comprised of 17 countries. It measures 7,500,000km<sup>2</sup> with a population estimated at 250 million inhabitants (that is about 30% of Africa's total population).

## 1.1 Two major eco-geographical areas

The region's geography is characterized by the following two major entities: (a) the nine (9) countries of the Sahel comprising Burkina Faso, Cape Verde, The Gambia, Guinea Bissau, Mali, Mauritania, Niger, Senegal and Chad; (b) eight (8) countries located along the Gulf of Guinea consisting of Benin, Côte d'Ivoire, Ghana, Guinea, Liberia, Nigeria, Sierra Leone and Togo.

In West Africa, rainfall, which is a determining factor of the climate, is associated with the latitudinal movement of the Intertropical Convergence Zone (ITCZ), i.e. the convergence zone between humid air masses from the south and dry air masses from the north. The ITCZ reaches its northernmost position in August, which corresponds to a period of maximum rainfall across the Sahel. This mechanism characterizes the Sahelian area's North-South annual rainfall gradient. Accordingly, annual rainfall amounts range from zero in the desert (Sahara) to over 900mm in the Sudanian sub-humid zone. In arid, semi-arid and sub-humid zones, there is a two to five-month wet season unlike countries located along the Gulf of Guinea, which have two rainy seasons. In that sub-zone, average annual rainfall amounts are in excess of 900mm.

Most West African countries span several eco-geographical zones including: (a) the Saharan desert zone with average annual rainfall amounts below 150mm, (b) the Sahelian arid zone, which receives average annual rainfall amounts in the range of 150–400mm; (c) the Sudano-Sahelian semi-arid zone where average annual rainfall amounts range from 400 to 600mm; (d) the sub-humid Sudanian zone with average rainfall amounts in the range of 600–900mm; (e) the humid Sudano-Guinean and Guinean zone where annual rainfall amounts range from 900mm to over 1500mm.<sup>1</sup> This particular setting translates into a marked contrast between wet and dry sub-regions.

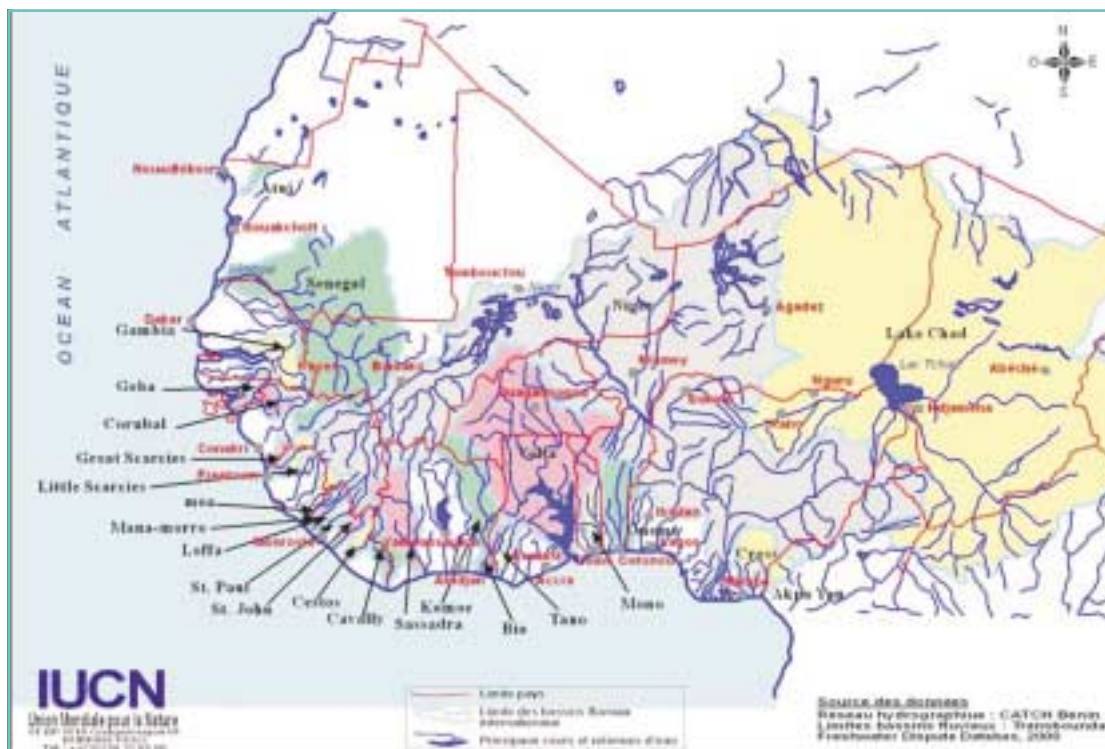
## 1.2 Interzonal freshwater transfer

However, this contrast is somewhat attenuated by the drainage pattern. The region's major watercourses (Niger, Senegal, Gambia, Volta, the hydrological network of Lake Chad) have their source in the Sudano-Guinean areas with a lot of rainfall and flow through the Sahelian zones where recurrent rainfall deficits occur. These watercourses enable a sort of interzonal freshwater transfer from wet to arid areas.

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<sup>1</sup> Localized maximum precipitation values are recorded, for instance, on mountainous areas such as Fouta Djallon.

**Fig. 1 West African transboundary river basins**



### 1.3 Sahelian floodplains

Thanks to these transfers, large areas of the Sahel, measuring up to 4.6 million hectares during years with good flow regime, are flooded on a yearly basis. The largest Sahelian floodplains undergoing annual flooding include the Niger River Inland Delta (three million hectares), the Middle Senegal River Valley (500,000ha) and the Hadejia Nguru Plain across northern Nigeria (400,000ha), the Chari-Logone Plain between Cameroon and Chad (about 800,000ha). These plains, which play host to a rich biological diversity (plant, ichthyological and avian in particular), are also well-known for their considerable importance in supporting local production activities (flood recession cultivation, animal husbandry and fisheries).

### 1.4 Water interdependency

These interzonal transfers are an indication of the significant interdependency of West African countries with regard to freshwater resources use and management. Most of these countries have a dependency factor of above 40%.<sup>2</sup> Another manifestation of this interdependency is that the region's major river systems are shared by several countries: the Niger River (nine countries to which Algeria, which partially covers the hydrologically inactive portion of this hydrographical basin, can be added), the Senegal River (four countries), the Volta River (six countries), Lake Chad (five countries), the Gambia River (three countries), the Comoé River (three countries). With the exception of Cape Verde, each of the countries of the region shares at least one international watercourse with other countries.

<sup>2</sup> The dependency factor consists of the share or percentage of total renewable water resources generated outside the borders of a given country. It should be noted that countries such as Niger and Mauritania have a dependency factor in the order of 90%.

## **1.5 Concentration of populations and industries on the coastal area**

Another distinctive feature of the region is the length of its sea front. It extends over 15,000km including Cape Verde. The 17 countries of the region include only four landlocked states (Mali, Burkina Faso, Niger and Chad). The region's population, concentrated on the coastal area (that is within 60km from the coastline), was estimated at 42.68 million in 1994, that is a quarter of the coastal countries' population (Hatzios *et al.*, 1996). Major urban areas such as Nouakchott, Dakar, Conakry, Abidjan, Accra, Cotonou, Lomé, Lagos, Port Harcourt, etc. are located along the coastline. This area experiences continuous rapid demographic growth due to the impoverished countryside and the concentration of economic infrastructures and investments in large coastal urban areas. In Senegal, 90% of industrial units are located along the coastline, mainly in Dakar and its suburbs. The same is true of countries such as The Gambia, Côte d'Ivoire, Nigeria, etc.

## **1.6 Extreme poverty in the region**

Poverty is another distinctive feature of the West African region. According to the UNDP Report on Sustainable Human Development for the year 2000, the 30 countries with the lowest human development index include 14 West African countries, that is, all the countries of the region with the exception of Liberia (which was not ranked), Ghana and Cape Verde. Out of the 49 Least Developed Countries (LDCs) listed worldwide, 14 are located in West Africa, that is, all the West African countries with the exception of Ghana, Nigeria and Côte d'Ivoire. Even at a continental level, West Africa remains one of the poorest regions. A recent report by the African Development Bank (*Fostering Good Governance in Africa*, 2001) estimates West Africa's per capita Gross Domestic Product (GDP) at less than USD340 against the continental average of above USD700. In other words, West Africa is the poorest region of the poorest continent in the world.

## **1.7 Key role of rainfed agriculture**

Despite the massive population exodus to urban centres over the past four decades, the bulk of West Africa's population remain in the countryside and its main means of livelihood still largely depends on agriculture. On average, two-thirds of the West African working population is engaged in agriculture. It accounts for about 30 % of the regional GDP (see Table 1 below). The region's dependence on the vagaries of the climate is better assessed by taking into account the fact that agriculture is mainly rain-fed, irrigation being very insignificant, both in terms of irrigated surface area and overall contribution to agricultural production.

## **1.8 Under-utilized hydro-agricultural potential**

Water resources, wetlands and natural resources in general contribute significantly to West African countries' economies. The main sector using water resources is agriculture, particularly irrigated farming (76% of freshwater withdrawals), against 17% and 7% for domestic and industrial uses respectively. With regard to domestic consumption, in 1995, only 40% and 64% of the region's rural and urban populations respectively, had access to drinking water. Hydropower generation and navigation are non-consumptive water user sectors. The region's water resources are poorly developed

**Table 1. Significance of the agricultural sector in West African national economies**

	Pop. (2000) in thousands	% of the pop engaged in the agricultural sector (1996)	Contribution of agriculture to the GDP (%)
Benin	6,097	54	39
Burkina Faso	11,937	84	33
Cape Verde	428	35	12
Chad	7,651	72	40
Côte d'Ivoire	14,786	49	26
The Gambia	1,305	80	27
Ghana	20,212	52	10
Guinea	7,430	74	22
Guinea Bissau	1,213	79	62
Liberia	3,154	70	n.a.
Mali	11,234	80	47
Mauritania	2,670	45	25
Niger	10,730	86	41
Nigeria	111,506	64	32
Senegal	9,481	77	17
Sierra Leone	4,854	61	44
Togo	4,629	67	42
<b>TOTAL</b>	<b>229,317</b>	<b>66</b>	<b>29</b>

Source: Based on UNDP, 2000; ADB, 2001.



**The Manantali Dam on the upper Senegal River, *Ibrahim Thiaw***

and their low level of exploitation (below 3%) testifies to it. Another indicator of the poor optimization of water resource use is that West Africa has not invested much in the construction of dams. The region includes less than one-tenth of the 1300 large dams built in Africa while it accounts for one-third of the surface area of this continent. The region's 110 large dams<sup>3</sup> are mainly intended for irrigation, hydropower generation and water supply for domestic consumption.

## 1.9 Insignificant greenhouse gas emission

Due to its poverty and the poor development of the industrial sector in its economy, West Africa – and Sub-Saharan Africa as a whole – emits little greenhouse gases in the atmosphere and therefore does not contribute much to the current global climate change, which is defined as human-induced climate modification. As a matter of fact, Sub-Saharan Africa accounts for only 2% of global carbon dioxide emissions, which is the main greenhouse gas. This means that Africa is affected and will continue to be affected over the coming decades by climate change for which it is not accountable (see Table 2). Consequently, it is quite understandable that during debates on climate change, the region places greater emphasis on issues related to adaptation rather than the mitigation of greenhouse gas emissions.

**Table 2. Carbon dioxide emissions worldwide**

	Share of worldwide total (%)	Per capita (tons)
Sub-Saharan Africa	2.0	0.9
Total for developing countries	36.4	2.1
Total worldwide	93.8*	4.1

\* Below 100% due to some countries not being taken into account.

Source: UNDP, 2000. p.234.

## 1.10 Significant efforts for regional integration

West African countries belong to various political and economic sub-groupings aiming for regional integration. With the exception of Chad and Mauritania, all of them are member countries of the Economic Community of West African States (ECOWAS). Countries referred to as Sahelian are grouped together into the Permanent Interstate Committee for Drought Control in the Sahel (CILSS), while the West African Economic and Monetary Union (WAEMU) includes Burkina Faso, Benin, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo. In addition, there are transboundary river basin organizations composed of two or more States: the Niger Basin Authority (ABN), the Senegal River Development Organization (OMVS), the Gambia River Basin Development Organization (OMVG), Lake Chad Basin Commission (LCBC), etc. Therefore, the sub-region has several co-operative organizations within which joint responses to transboundary challenges such as climate change can be envisaged.

<sup>3</sup> A large dam is defined by the International Commission on Large Dams as a dam with a height of 15m or more from the foundation. If dams are between 5–15m high and have a reservoir volume of more than three million m<sup>3</sup> they are also classified as large.