

Executive summary

GIWA region 42 covers the Guinea Current Large Marine Ecosystem (GCLME) and the basins of the rivers flowing into it. The coastal zone stretches over 5 560 km from the Bissagos archipelago in Guinea-Bissau to the mouth of the Congo River. The region includes 28 international river basins and covers entirely or partially 27 countries with a land area of 8 340 200 km². In spite of the differences in size and population, the countries share many similarities in socio-economic conditions. First and foremost in relation to demography, culture and history; but also in relation to economy and social conditions, with the World Bank characterising most of the countries of the region as “Least developed countries”.

The demand for water arises mainly from agriculture, followed by domestic and industrial demands. The basic water supply and sanitation sectors lack development and investment. Freshwater, coastal and marine areas all serve as important sources of food and protein to the local populations.

The region contains huge variations in hydrological conditions of its freshwater resources; from the Sahel deserts and dryland in the northern Niger Basin to the tropical jungles of the DR Congo. Therefore it was deemed necessary to carry out the GIWA assessment on the basis of the four major international river basins in the region: the Niger and the Volta basins, predominantly in the arid and semiarid Sahel; the Comoe, predominantly in the more humid coastal zone along the Gulf of Guinea; and the Congo, representative for equatorial Central Africa. These four entities represent 75% of the region’s area and 90% of the total area of international basins in the region. The marine issues are of different nature and accordingly, the Guinea Current LME and its coastal waters were assessed as a fifth entity.

The main water-related environmental concerns and issues were identified in each assessed entity. The table below gives an overview of the concerns and issues and their order of priority:

Overall view of the priority concerns and issues in the Guinea Current region.

Basin	Concern-Issues 1	Concern-Issues 2	Concern-Issues 3	Others
Comoe River	Pollution <ul style="list-style-type: none"> Eutrophication Microbiological (not an international issue) 	Habitat and community modification <ul style="list-style-type: none"> Loss of ecosystems 	Unsustainable exploitation of fish and other living resources <ul style="list-style-type: none"> Overexploitation 	Freshwater shortage <ul style="list-style-type: none"> Modification of stream flow
Volta River	Freshwater shortage <ul style="list-style-type: none"> Modification of stream flow Lowering of water table 	Habitat and community modification <ul style="list-style-type: none"> Modification of ecosystems 	Unsustainable exploitation of fish and other living resources <ul style="list-style-type: none"> Overexploitation 	Pollution <ul style="list-style-type: none"> Microbiological Global change¹ <ul style="list-style-type: none"> Changes in hydrological cycles
Niger River	Habitat and community modification <ul style="list-style-type: none"> Loss of ecosystems Modification of ecosystems 	Freshwater shortage <ul style="list-style-type: none"> Modification of stream flow Changes in water table 	Unsustainable exploitation of fish and other living resources <ul style="list-style-type: none"> Overexploitation Destructive practices 	Pollution <ul style="list-style-type: none"> Eutrophication Global change¹ <ul style="list-style-type: none"> Changes in hydrological cycles
Congo River	Pollution <ul style="list-style-type: none"> Chemical Solid wastes 	Unsustainable exploitation of fish and other living resources <ul style="list-style-type: none"> Overexploitation 	Freshwater shortage <ul style="list-style-type: none"> Modification of stream flow 	Habitat and community modification <ul style="list-style-type: none"> Loss of ecosystems Modification of ecosystems
Guinea Current Large Marine Ecosystem (GCLME)	Pollution <ul style="list-style-type: none"> Chemical Oil spills 	Unsustainable exploitation of fish and other living resources <ul style="list-style-type: none"> Overexploitation Destructive practices By-catch 	Habitat and community modification <ul style="list-style-type: none"> Loss of ecosystems Modification of ecosystems (incl. coastal erosion) 	Global change¹ <ul style="list-style-type: none"> Sea level change

¹ Changes in hydrological cycles could fall into Global change if the present assumptions become scientific evidences. This concern may become a priority for the future.

The following general conclusions may be drawn:

Habitat and community modification, together with the closely associated concern **Unsustainable exploitation of fish and other living resources**, are regional concerns that occur in all five entities.

Freshwater shortage is a key concern in the river basins of the Sahel such as the Niger and Volta. **Pollution** is a general concern in the humid basins and in the coastal and marine waters. It is particularly related to national hotspots. International impacts are, so far, relatively limited.

There is scarcity of data and studies on the associated socio-economic impacts, but there is a general consensus, that the impacts are significant in relation to both public health and economic development.

Five cases were selected for Causal chain and Policy option analysis and are briefly summarised below.

Freshwater shortage in the Volta Basin

The immediate causes of the severe freshwater shortage in the Volta Basin were primarily associated with three main impacts:

- Reduction in natural rainfall input to the river system over the last 40 years;
- Increased diversion and water losses to satisfy agricultural water needs in the rural development sector;
- Increased diversion and associated water losses to satisfy the water supply needs of the ongoing urbanisation and industrialisation.

The root causes behind these impacts were identified as:

- Environmental conditions in the arid Sahel region, with decreasing precipitation;
- The rapidly increasing population, creating increasing needs for basic water supply and for agricultural production;
- The lack of appropriate technology responses to the water shortages, such as development of water efficient agricultural production systems and urban-industrial water supply systems;
- The lack of an appropriate governance framework to address the water conflicts in the Basin.

The following policy options were identified:

Improving water governance is of crucial importance in order to efficiently address the water shortages. Such governance shall address local, national and international water management issues in a comprehensive and transparent way by involving all appropriate stakeholders.

Addressing the climatic evolution in the Sahel region may be initiated by establishing a monitoring framework of the actual trends and by identifying their impacts on the development of the Basin, but also by advocating robust water policies with a minimum of risk of

failure due to adverse climatic conditions.

Improving water sector technology as such is a robust response increasing the efficiency of water use: consume less water per capita, and produce more crop value per volume of water used.

Control the population growth in the Basin to reduce future increases in water demand.

Habitat and community modification in the Niger Basin

The immediate causes of the ecosystem depletion in the Niger Basin were primarily associated with two main issues:

- Reduction in stream flow due to climatic evolution has had a significant impact on stream flow;
- Increased sediment loads from soil erosion due to poor land management practices have changed the water quality and the sedimentation patterns.

The root causes behind these immediate causes were identified as:

- Adverse climate evolution over the last 40 years;
- Population growth has significantly increased the per capita pressure on the natural resources;
- Lack of technological innovation and funds, has led to unsustainable land management practices;
- Lack of efficient governance constrains the possibilities to address the issues.

The following policy options were identified to address these causes:

Improving water governance with emphasis on a reform of the international and national policy and legislation framework by introduction of integrated land and water management. This can build on existing frameworks, in particular the Niger Basin Authority, through a comprehensive capacity development process.

Addressing climatic evolution by establishing monitoring frameworks of trends and impacts on ecosystems.

Improving agricultural and land use technology to increase the efficiency of the land and water uses in order to minimise the detrimental impact on ecosystems.

Reducing poverty as it is commonly accepted that poverty is one of the key constraints for efficient resource management and for depletion of the natural resources.

Controlling the population growth because, with less people, the excessive pressure on natural resources would decrease.

Eutrophication in the Comoe Basin

The immediate causes of eutrophication in the Comoe Basin were identified as nutrient discharges into the water systems from non-point sources i.e. soil erosion due to deforestation, bush fires, and inappropriate land management. The sources also include human and livestock excreta discharged directly along river courses. Point sources are less extensive but occur in areas where agro-industrial units and dense human settlements use the natural water system as sewers.

The root causes behind these immediate causes were identified as:

- Inefficient governance, causing insufficient integration of land and water management policy;
- Inappropriate land tenure regulations where lack of land ownership reduces incentives to achieve sustainability in agricultural practices;
- Inadequate knowledge about the effects of inappropriate land use practises, the effects of use of fertilisers, and the effects of failures in sewage systems.

The following policy options were identified:

Improving land and water governance appears to be the most urgent and appropriate policy option, in particular the introduction of integrated management of land and water within the context of the Comoe River Basin.

Reforming land tenure policies is recognised as a prerequisite for the fight against land degradation.

Improving stakeholder knowledge and awareness is considered an important option for active involvement of the farmers concerning the effects of poor soil management, deforestation and bushfires, and on the appropriate use of fertilisers.

Addressing poverty and lack of economic development constitutes one of the important root causes, but the corresponding policy options exceed by far the authority of the water management framework.

Heavy metal pollution in the Guinea Current LME

Chemical pollution by heavy metals is considered to be particularly critical as an international issue in the Guinea Current LME.

The immediate causes of chemical pollution by heavy metals were identified as follows:

- Effluents from metal plating enterprises (e.g. silver, copper, chromium, cadmium);
- Releases from mining activities (e.g. mercury used by artisanal gold miners);
- Leaching from solid waste dumps and landfills.

The main root causes of the land-based chemical pollution can be summarised as follows:

- Lack of knowledge, since the sources and the levels of chemical pollution are not well known. Also, the population is not aware of the health dangers they face.
- Administrative practices are not efficient, since environmental laws and regulations are not efficiently applied and enforced. Also, the development policies favour production at low cost rather than clean production.
- Inadequate technologies, since the processes used by industry and mining in Africa use heavily polluting methods and machinery.
- Poverty and the weak economies are aggravating factors to pollution, since people or enterprises do not have the financial means to change their practises. The market prices of their commodities do not motivate the adoption of less harmful but more costly techniques.

The possible policy options for approaching these causes have been identified as follows:

Improving knowledge about heavy metal contamination is recommended as an immediate action, being the key to better defining the other policy options. Thus, the implementation of a regional monitoring system for the chemical pollution in Gulf of Guinea is proposed as a first priority.

Improvement of the governance and management capacities should be initiated. As a first step, needs-assessment must be carried out. The institutional framework should be harmonised with legislation and designed according to the available human resources. The laws must be reviewed or reformulated according to the identified problems.

Improvement of technologies in the metal processing industry and the mining sector by introducing cleaner technologies and better waste management practices.

Use of economic instruments for reduction of pollution may be introduced to improve the behaviour of the polluters.

Overexploitation of fish and other living resources in the Guinea Current LME

The immediate causes for overexploitation of fish were identified as follows:

- Increased fishing effort, especially by foreign trawlers in the offshore areas. The demand for high quality fish and seafood products and for ornamental species has also contributed to the overexploitation of lagoon and coastal resources.
- Environmental changes in water temperatures and coastal upwelling play an important role in coastal pelagic fish abundance and productivity.

The main root causes of the decline of commercial fish stocks and the non-optimal harvesting of living resources were identified as:

- Inadequate knowledge about the complex ecosystem;
- Insufficient governance, such as an inadequate legal framework at the regional and national levels and inadequate policy implementation and enforcement.

The following policy options were identified:

Improving knowledge about fish stock dynamics and their relations to the environment is considered a key to reaching agreements among the 16 countries bordering the GCLME on sustainable fisheries.

Improving governance to promote sustainable fishing practices by facilitating the optimal harvesting of living resources. This includes the creation of a formalised institutional network, specialised in the management of living resources.

Promotion of sustainable development of mariculture and coastal aquaculture through biological and socio-economic assessments of potential and feasibility.