

Water pressure: climate change and adaptation in the Niger River Basin

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Climate change is expected to result in severe water stress over much of the African continent. Not only will water become scarcer in already dry regions, but changing freshwater temperatures could affect natural ecosystems and water quality. The Sahel, running along the southern edge of the Sahara, could see its water supply become even more erratic, increasing the risk of extended drought and more intense monsoons. Adapting to such potentially dramatic shifts will demand major adjustments to current water management systems and practices. But there is a serious complicating factor: more than 80 rivers and lakes on the continent are shared by two or more countries. As experience in the Niger River Basin shows, this interdependence must be a priority in regional, national and local adaptation strategies that affect transboundary water sources.

Climate change and water in Africa

Climate change and freshwater systems are interconnected in complex ways, with rainfall patterns, evaporation and water use influencing the availability of surface and groundwater. The direct impacts of climate change on these systems stem from the relationship between precipitation and/or temperature and the abundance and quality of water resources. Climate change may also have indirect impacts by causing shifts in temperature, population, lifestyle, economy or technology that in turn trigger shifts in demand for water.

Climate change is also expected to amplify and entrench water resource anomalies such as local drought or flooding at the river/lake basin level. The Intergovernmental Panel on Climate Change (IPCC) has indicated that the persistent drought in the Sahel since the late 1960s has resulted in a decrease in the availability of freshwater resources. The IPCC's 2007 Fourth Assessment Report, confirming its earlier findings, shows that trends in Africa include a rise in average temperatures of 0.7 °C for most of the continent

during the 20th century, and decreases in rainfall of up to 30 per cent over large portions of the Sahel. In the Niger River Basin, the river's mean annual discharge declined by 40-60 per cent. In future, the basin could see changes in rainfall, evaporation and runoff of approximately 10 per cent, although the scant available data make it difficult to predict these changes with any certainty.

The Fourth Assessment Report further notes that 25 per cent of the population of Africa — more than 200 million people — currently experience water stress. The population at risk of increased water stress in Africa is projected to be between 350 million to 600 million by 2050.

Water management as adaptation

Water management affects how vulnerable freshwater systems are to climate change. So the institutions governing water allocations and water infrastructure play an important role in determining how and where water resources are used. The IPCC has recognised the need for regional coordination in water management, particularly in international and shared basins, and it recommends that international basin authorities should be strengthened and backed by robust legal frameworks. In its Fourth Assessment Report, the IPCC states that current water management practices are unlikely to be capable of reducing the negative impacts of climate change on water supply reliability, flood risk, health, energy and aquatic ecosystems. Better incorporation of current climate variability into water-related management would, however, make adaptation to future climate change easier.

Adaptation in the water sector involves altering hydrological characteristics to suit human demands, and altering demand to suit water availability. On the supply side, adaptation could include increasing storage by building dams and reservoirs, desalination or rainwater storage. On the demand side, measures could include improving water use efficiency and water recycling, reducing irrigation by changing cropping practices, importing agricultural

KEY MESSAGES:

- The impacts of climate change on shared rivers will require regional as well as national solutions.
- There is a need to enhance the capacity of regional bodies that coordinate water management, and to mainstream climate change and adaptation into their planning processes.
- Adopting a basin-wide approach, based on integrated catchment management, may have a number of environmental, social and economic benefits for countries in the region.

products to irrigation areas and promoting local practices such as rainwater harvesting.

Traditionally, water has been managed on the assumption that historic seasonal patterns will persist. Now, the uncertainties of climate change, such as greater risk of drought or floods, demand a more dynamic approach. The integrated catchment management framework is one method that seeks to respond to the shifting conditions of climate change. However, few African countries have implemented this approach to date.

The Niger River Basin: water in West Africa

Running in a giant crescent from Guinea to Nigeria, the Niger River in West Africa is, at over 4000 kilometres in length, the third longest river on the continent. The Niger River Basin has a total area of over 2 million square kilometres, spanning 7.5 per cent of the continent. Its water resources are shared between nine countries: Benin, Burkina Faso, Cameroon, Chad, Côte D'Ivoire, Guinea, Mali, Niger and Nigeria. The river is also the second largest wetland in Africa and is home to biodiversity of global significance.

Compared to other African river basins, the Niger Basin has not reached levels of high stress. The use of freshwater in West Africa represents only 1 to 3 per cent of the region's total renewable water resources and many countries retain a large potential for irrigation. For example, Mali currently irrigates less than 25 per cent of its share of the basin. However, if current trends are maintained, levels of freshwater withdrawal are likely to grow sixfold by 2025.

River systems are facing a number of human-induced pressures, including over-exploitation of groundwater, poorly coordinated infrastructure projects, pollution and the removal of plant cover along banks. There has also been a significant increase in dam construction in West Africa. On the Niger River, for example, there are proposals for at least 20 new dams. These offer a way of providing a reliable water supply, but can also affect patterns of access to water resources that support communities, industry, livestock, wildlife and ecosystems.

Water management policies in the Niger Basin

Across the Niger River Basin, countries are pursuing policies and strategies aimed at addressing poverty reduction, sustainable development, climate change and natural resource management. These are often developed independently at the national level in response to mandates set by the international community. A case in point is the National Adaptation Programmes of Action being developed by the Least Developed Countries under the UN Framework Convention on Climate Change.

There have been a number of attempts to coordinate and harmonise policies for the management of shared water resources in Africa generally and in specific basins such as the Niger River Basin. However, these efforts have met with varying degrees of success.

The Niger Basin Commission was first established in 1964 to coordinate the nine countries' sharing of water resources in the basin. The Commission, which has evolved into the Niger Basin Authority (NBA), now aims to promote inter-state cooperation for the integrated development of natural resources of the basin, as well as harmonisation of national development policies.

In 2004, at the Conference of the NBA heads of states, the resulting Paris Declaration, relating to the 'Principles of Management and Good Governance for Sustainable and Shared Management of the Niger Basin', endorsed a shared vision for the basin's future management.

While this shared vision does not explicitly address the impacts of climate change and the need to adapt to them, it nevertheless provides a model for regional cooperation and an institutional framework within which decisions can be made for the whole basin. Importantly, the shared vision reflects emerging principles of best practice water governance, including the equitable and sustainable use of water and prior consultation and cooperation among basin states. This kind of approach is imperative when looking at the impacts of and responses to climate change on water availability within a shared river basin.

There is growing awareness of the impact of climate variability and change on water resources. However, more work needs to be done to promote international and basin-level collaboration on climatic and hydrologic data collection and adopting water management approaches that respond to the integrated nature of transboundary river basins.

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