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CLIMATE CHANGE VULNERABILITY

AN OVERVIEW ASSESSMENT FOR WEST AFRICA

CONTEXT

Virtually all climate models project that temperatures will increase by 2.5 to 3.5 C° by the end of the twenty-first century, but changes in rainfall are less certain. This is especially true in West Africa, where accurate climate modeling is hindered by the quantity and quality of available data. This uncertainty makes it difficult to accurately project the impacts of climate change on West Africa and its wide range of ecological regions; these many regions, in turn, preclude development of a single scenario that applies to the whole area. Rainfall is critical to the livelihoods of the vast majority of the region's rural population, so planning for the future will require identifying a range of likely scenarios for each ecological zone and economic sector, and adopting approaches that manage risks and respond to events using a flexible portfolio of actions. Developing this portfolio will require drawing on national and regional research findings, as well as working with local governments and donors in collaboration with affected communities.

FINDINGS AND RECOMMENDATIONS

The major issues to be considered in developing a plan of action for climate change differ depending on the ecological zone. While there are many ways to subdivide West Africa, this assessment divides the region into three primary ecological zones: the Sahel, the coast, and the tropical inland forests.

For the Sahel Zone

Climate models project that temperature increases for the Sahel will be greater than those for the coast. In many models, annual rainfall is expected to increase slightly in the central Sahel but decrease slightly in the western Sahel. More critically, some models suggest that there could be delays in the onset of the rainy season, more frequent extremes of drought and flood, and increased variability in intra-seasonal rainfall. The overall effect of these temperature and rainfall changes will tend to reduce the overall availability of water in the Sahel.

Agricultural systems will be affected by increasing temperatures, as well as by less reliable and more variable rainfall. While pastoralist systems have traditionally been well-adapted to changes in climate, they are now being constrained by agricultural expansion and changes in land management policy. These pressures are already causing increasing levels of conflict between pastoralists and farmers. In addition, negative impacts on livelihoods within the Sahel may drive more of the population toward the coast, either to search for seasonal opportunities or to relocate permanently.

Investments in the Sahel should support better management of available water resources, including those in transboundary watersheds. Research is needed to advance breeding and improve management

of crops that will tolerate drought, heat, and waterlogging. Seasonal migration out of the Sahel could be encouraged by generating additional employment opportunities elsewhere, and policy options need to be found that will help those who do not migrate to better cope with climate extremes. Other strategies might include investments in decentralized, small-scale water supply infrastructure; integrating climate risk management with existing re-greening strategies; providing more accurate climate and weather information; working with local communities and governments to identify the most flexible and sustainable options for agriculture, agroforestry, and re-greening; and identifying improved opportunities for pastoralists.

For the Coastal Zone

Climate models predict an increasing risk of sea level rise, extreme rainfall events, and flooding in the coastal zone. While there are expected to be impacts on coastal fisheries, the intensity of these impacts are uncertain. Rising sea levels and changes in rainfall may also result in salinization of groundwater or estuaries.

Unlike the Sahel, vegetation in the coastal zone is mainly composed of broadleaf forests and savannah, and the economy depends heavily on tree crops. This zone is also the most densely populated of the three. People have been migrating into this zone from the Sahel, a trend that will likely continue, and perhaps increase, as the climate changes, altering the region's social, economic, and political dynamics. Unfortunately, many people migrating to the coast have settled in areas at risk to rising sea levels. Investments in the coastal zone should focus on improved data and capacity to support urban planning and integrated coastal zone management. Decision makers and the public need to be informed of the risks and potential impacts of a rising sea level. Monitoring of the quality and quantity of freshwater, particularly where aquifers are at risk of salinization, needs to be improved. Governments need to explore ways to improve governance and institutional capacity to promote sustainable fisheries. Other strategies for this zone could include support for efforts to preserve, protect, and restore coastal wetlands; integration of alternative income-generating activities into coastal wetlands management; and sustainable expansion of onshore and offshore aquaculture.

For the Tropical Inland Zone

Climate models suggest that there may be some additional greening of this zone in coming decades, but as in other zones, the inland areas will be subject to higher temperatures. Agriculture in the tropical inland areas of West Africa — mainly a mix of tree crops, annuals, and livestock keeping — is typically not limited by rainfall, although variations from year to year can affect production. Therefore, rising temperature, and perhaps increased flooding from extreme events, is most likely to have the greatest climate-related impact in this region.

Investments in this zone are needed to improve the breeding and management of heat-resistant varieties of crops as well as the development of farming practices appropriate to hotter growing conditions. As in the Sahel, better management of transboundary watersheds will be necessary. Other strategies might include support for agricultural intensification and modernization in areas that have the potential for higher productivity; investment in decentralized, small-scale water supply infrastructure; transboundary programs that promote and safeguard gains in forested and reforested areas; carbon sequestration efforts; and brush fire control.

ADDITIONAL INFORMATION

This brief highlights key conclusions from Baptista, S., Brottem, L., de Sherbinin, A., Edquist, M., Fischer, A., Levy, M., Schnarr, E., Simon, C., Sundareshwar, P.V., and Trzaska, S. (2013). *Background Paper for the ARCC West Africa Regional Climate Change Vulnerability Assessment*. USAID. Interested readers are invited to review the full paper at <http://community.eldis.org/ARCC/>.