World Resources Report

Climate Change Adaptation and Decision Making in the Sudan

By Dr. Mutasim Bashir Nimir and Mr. Ismail A. Elgizouli, Government of Sudan

Question Two: How can we balance today's pressing needs with long term risks? How can public officials, especially in low income countries, address today's short- term pressing needs while preparing for tomorrow's climate-related impacts and surprises?

Sudan's inherent vulnerability to climate change is captured by the fact that food security is mainly determined by rainfall, particularly in rural areas where more than 65% of the population lives. In the Kordofan Region, models predict that millet production will decline between 15% and 62%, and sorghum yield between 29% and 71% in the period 2030-2060. Mainstreaming of climate adaptation efforts in the face of such risks will require: a national land use plan and reform of land tenure; policies and strategies that guarantee food security and the provision of safe, potable water; strategies that enhance agricultural productivity; and a national early warning system, among others.

Introduction

Sudan, the largest country in Africa, covers an area of about 2.5 million km^2 much of which is comprised of desert and arid land. It lies within tropical zones - between

3° and 23° N and 21° 45'' and 36° 30'' E - borders nine countries and shares surface and ground water with 12 countries. Its topography can be broadly characterized as vast plains interspersed by several widely separated ranges of hills and mountains. The country is 29 percent desert, 19 percent semi-desert, 27 percent low rainfall savanna, 14 percent high rainfall savanna, 10 percent flood regions (swamps and areas affected by floods) and less than 1 percent mountain vegetation. The country's population is 40 million people (2008 Census) and the country is divided administratively into 25 states. The economy has long depended on agriculture and livestock as exports but in recent years small oil deposits have been exploited.

Climate change, impact of vulnerability

An examination of Sudan's ecological zones, as described above, indicates that the majority of its land is quite vulnerable to change in temperature and precipitation. The country's inherent vulnerability may best be captured by the fact that food security is mainly determined by rainfall, particularly in the rural areas where more than 65% of the population lives.

Mean annual temperature lies between 26° to 32° but in some places it reaches 47° C causing a lot of stresses and heat related diseases. Rainfall is erratic and varies significantly from the North to the South. The unreliable nature of rainfall together with its concentration during the short growing season increases the vulnerability of the rain-fed agricultural system. A trend of decreasing annual rainfall in the last 60 years (0.5%) and increased rainfall variability is contributing to drought conditions in many parts of the country. This pattern has led to serious and prolonged drought episodes. For example, Sudan experienced a succession of dry years from 1978 to 1987 resulting in severe social and economical impacts including many human and livestock fatalities and migration and displacement of several million people. Drought problems such as these will increase if trends continue.

Sudan also experienced many devastating floods, of two specific types, during the past several decades. The first type occurs during torrential rain when high levels of water overflow the River Nile and its tributaries, usually due to above normal rainy seasons in the Ethiopian Plateau. Severe floods were reported in 1946, 1988, 1994, 1998 and 2001. The other type of flood occurs as a result of heavy localized rainfall during the rainy summer season and such incidents were reported in 1952, 1962, 1965, 1978-1979, 1988 and 1997. In addition to drought and floods there are

other climate extreme events such as dust storms, thunderstorms and heat waves whose occurrence though less frequent, still pose serious threat to local livelihood.

Beside the adverse economic impacts of these climate change related phenomena there are also associated social impacts. For example during drought events conflicts occur due to competition over diminished natural resources. Also - as has happened many times - food shortages lead to famine, followed by displacement and refugees which in turn leads to misuse of the natural resources that remain. During floods and droughts people typically move to cities where their arrival causes stress and shortages of already limited services. The displaced also live in very acute conditions that can lead to disturbances that undermine stability and security.

Non climatic factors also contribute to increased vulnerability, especially in rural areas and local communities. Studies from the preparation of the Sudan National Program of Action (NAPA) show that in five states representative of the country's five ecological zones non climatic factors that increased vulnerability included: deep poverty; lack of income diversity; lack of agricultural inputs; resource mismanagement; increased cultivation; fragile land and water resources; poor soil fertility; deforestation; natural resource conflicts; poor extension services; community displacement, and poor sanitation and health services.

Expected Impacts of Climate Change

Climate scenarios analysis conducted as part of the preparation of Sudan's First National Communication in one of the Sudanese Administrative Regions (Greater Kordofan) indicates that the average temperature is expected to rise significantly relative to baseline expectations. By 2060 projected temperature ranges from 1.5^{0} C to 3.1^{0} C during August and between 1.1^{0} to 2.1^{0} during January. Results from some models show that average rainfall decrease of about 6mm/month (5%) during the rainy season. Such changes in temperature and rainfall will affect adversely the most important sectors in Sudan, namely agriculture, water resources and health.

Agriculture and Forestry Sector study findings show that humid agro-climate zones will shift southwards, rendering areas of the north increasingly unsuitable for agriculture. For example in Kordofan Region millet production is predicted to decline between 15% and 62%, sorghum between 29% and 71% and gum Arabic between 25% to 30% during the period 2030 to 2060. Most affected will be traditional farmers and pastoralists. It is expected that increases in temperature

and variability in precipitation combined with growing socioeconomic pressure are likely to intensify the ongoing process of desertification in Kordofan Region and beyond. Under such a scenario, the area of arable land as well as the gum belt would decrease hence food security and local income will drop dramatically.

Water Sector study findings show that availability is a perennially critical issue in an extremely arid country. There will be a risk of decreased precipitation and/or increased temperature and evaporation that has grave repercussions for Sudan. According to these findings, in a matter of years, water availability may be the most critical issue facing Kordofan Region. The water assessment shows soil moisture declining under future climate conditions. A combination of water consumption, population growth, high rates of evaporation and high rainfall variation are predicted to lead to a situation of water crisis.

Health Sector study findings show that communities in Sudan would be exposed to significantly increased risk of malaria due to climate change. The study of Kordofan Region in particular suggests the risk of transmission potential could be increased substantially by 2060. If realized, not only would the overburdened heath care system experience extreme stress but the disease would exert a heavy toll on local communities.

Decision making Process:

The 25 states of Sudan carry out functions and provide armed with legislative powers as stipulated in the interim-constitution of 2005 which has governed Sudan since the Comprehensive Peace Agreement (CPA) was signed between the government of Sudan and Sudan Peoples' Liberation Movement (SPLM).

At the national level, the federal organs of the Government of National Unity (GONU) exercise power over planning, legislation and execution on federal lands, natural resources, mineral and subterranean wealth, inter-state waters, national electricity projects, epidemics and disasters.

The Government of Southern Sudan (GOSS) exercises power in the areas of police, prisons and wildlife services, planning, education, health and welfare and coordinate with GONU on concurrent powers.

State government organs exercise power, within state borders, over state lands, natural resources, animal wealth, wildlife, non-Nile water and electric power. States in turn are divided into localities governed by local councils. Members of

councils are directly elected and as such link grassroots governance to the federal government.

There are concurrent powers where federal (national), regional (GOSS) and state organs exercise power over education, health, environment, tourism, industry and meteorology.

Agriculture planning: Plans to develop the agricultural sector have had limited success in achieving their objective due to the low priority assigned to agriculture in allocation of resources, lack of political stability, and a top-down approach to development which reduced rural producers to policy-receivers. Recently, Sudan has taken a new and strategic direction to support agriculture. The Agricultural Revival Program (ARP) of 2008 is designed to address past weaknesses and coincides with NAPA objectives. Throughout Sudan, local competition for land and water resources among different groups has increased over the past 40 years. The 1970 land registration, whereby unregistered land - even where used by tribal communities - was formally assumed by the State, has been a compounding causal factor of conflict. Efforts at agricultural reform are also complicated by the existence of two systems of land ownership in Sudan; land ownership under customary law and land ownership under statutory law. In addition, recent government policies favor foreign investors and allocate them vast areas of land.

Water planning: In order to fulfill overall objectives of water resources planning and management, and enhance the development and implementation of effective national water policies and strategies for integrated water resources management (IWRM), the Sudan National Water Policy was developed in 2003 This brings together aspects of water resources management, utilization, and protection in the context of a single policy and covers sectors including agriculture, industry, health, energy and transportation. To increase its effectiveness, the water policy should pay more attention to pricing and fuller participation by stakeholders. Relevant concepts that could have been better considered and incorporated include: water as an economic good, adoption of an analytical framework, institutional and regulatory systems, incentives, water conserving, poverty alleviation, participatory approaches, environmental protection and capacity building.

Overall approach to environmental protection:

Environmental protection has been embodied in various sector-based pieces of legislation passed by the Sudan government. There are 19 laws dealing with land

tenure and land use planning, 10 on soil conservation, four on forestry, nine on wildlife and protected areas, 16 on water resources, five dealing with marine resources and coastal management, five on livestock, six on hazardous substances, four on energy and mining, ten on environmental health and one on antiquities.

To overcome the problems of such conflicting and overlapping laws, the Environmental Protection Act of 2001 was established as umbrella legislation, emphasizing protection of the environment and its natural balance and the conservation of its component social and cultural elements in order to achieve sustainable development. It empowers the Higher Council for Environment and Natural Resources (HCENR) to coordinate the work of State Councils for Environment and Natural Resources (SEC), establish long term policies and to promote research and awareness. Currently the Environmental Act is subjected to revisions to accommodate changes stipulated by the 2005 Interim-Constitution.

Overall approach to implementing UNFCCC and adaptation:

Soon after the Earth Summit, Sudan signed and ratified the UNFCCC on the 19th of November 1993 and committed itself to active cooperation within the global community to address the problem of climate change. Sudan submitted its First National Communication in 2003, prepared a NAPA in 2007 and is now implementing NAPA Priority Interventions to Build Resilience in the Agriculture and Water Sectors to Adverse Impacts of Climate Change in Sudan, besides developing the Second National Communication.

The impacts of climate change and the impacts of social and environmental baseline processes, occurring in the absence of climate change, may serve to compound one another. Thus a more in-depth look at these relationships is needed for systematic integration of the main UNFCCC concepts into national policy processes. Nevertheless the Council of Ministers approved the First National Communication and NAPA and in 2010 directed HCENR to coordinate NAPA implementation with the Agricultural Revival Program.

The strategy goals of Sudan's 25 year vision, as well as ongoing national policy processes have parallel aims to climate change adaptation (i.e poverty reduction strategy paper and rural development initiatives). The NAPA follow-up project is clearly embedded in baseline activities and through its focus on reducing the

additional risks associated with climate change will enhance the effectiveness of on-going development investments.

It has been often noted that Sudan strategic planning is sectorial in nature, led by limited groups of politicians and a few professionals, never based on wide grassroots consultations and often subjected to poor implementation. The long-term solution to the vulnerability of Sudan communities and economic sectors to climate change is effective mainstreaming of adaptation strategies into the national planning process. This is directly related to the achievement of the Millennium Development Goals (MDGs), the promotion of sustainable national and local agendas and the integration of climate change risks into all of these planning processes. While resources are vital to success, they are not sufficient to promote human development in a sustainable manner. Particular emphasis should be given to building the capacities of civil society organizations.

Limiting factors include the following. A limited effort has been spent to foster awareness of climate risks to food security. Government institutions are subject to frequent changes due to political instability and this has resulted in limited incorporation of multilateral environmental agreements such as the UNFCCC. In addition, the drought contingency planning framework contains a weak component for ensuring food reserves and the Strategic Reserve Authority established in 2000 is not yet effective in achieving its goals and objectives.

Recommendations for mainstreaming adaptation policy

Several policy issues were identified during the NAPA preparatory phase including the following broad areas.

- Policies for water resource management and agriculture should stress provision of safe potable water at the level of rural area, towns and migrating tribes' routes. The latter is particularly important for the reduction and avoidance of conflicts and friction between farmers and herders.
- Policies and strategies that guarantee food security (for both human and animals) should be developed.
- A national land use plan should be adopted.
- Policies and strategies should target pursuing the ideal environmental utilization of natural resources.
- Strategies should enhance agricultural productivity.
- Gaps in laws and legislation that regulate work should be addressed.

- A national early warning system should be established.

Specific areas that require attention are:

Reform of land tenure, provision of credit for farmers and pastoralists, more research and extension with emphasis on traditional sectors, increased expenditure on rural infra-structure and services, empowering of a rural monopoly in marketing agricultural commodities, development of crop mix and crop rotation for different areas and of water harvesting techniques, encouragement of agroforestry, range rehabilitation and promotion of livestock production, and removal of the monopoly on gum Arabic.

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10 G Street NE Suite 800, Washington, DC 20002, USA
Phone +1 (202) 729-7600
Fax +1 (202) 729-7610