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Multidimensional Climate Threats Require New Approaches and More Resources for Adaptation Challenge

Vicious circles of poverty and climate vulnerability

The burden of adjusting to the growing threats from climate change will be the heaviest for populations that are already challenged by multiple vulnerabilities associated with low levels of economic and human development. The likely damage to India and South-East Asia, for example, has been estimated at ten times that for the United States.

Poorer countries and communities with poor health care, lack of infrastructure, weakly diversified economies, missing institutions and soft governance structures may be exposed not just to potentially catastrophic large-scale disasters but also to a more permanent state of economic stress as a result of higher average temperatures, reduced availability of water sources, and more frequent flooding.

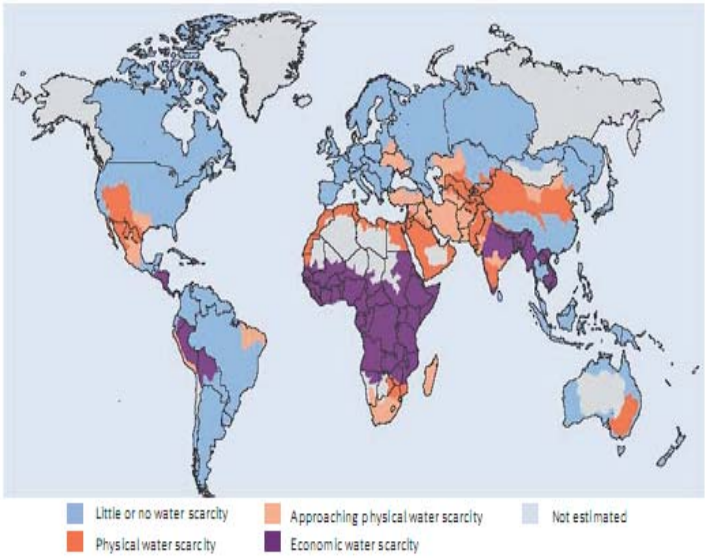
These stresses will likely increase the risks of food and income insecurity, further exposing inadequate levels of health care, sanitation, shelter and social infrastructures. Thus, countries that are already vulnerable to climatic shocks often find themselves trapped in a vicious circle of economic insecurity, persistent poverty, vulnerability to shocks and inadequate capacity to cope with those shocks

Water stress

Drought and water stress will be among the big policy issues in the coming decades. Threats to the availability and quality of water originating in river basins and glaciers pose serious risks to both urban and rural populations worldwide which depend on freshwater for their energy, food and livelihoods. In addition, water stress intensifies the burden of disease and inadequate health and sanitary conditions under which poor people often live.

Already more than 2 billion people live in dry regions of the world and suffer disproportionately from diseases related to contaminated or insufficient water (see figure 1). Scarcity of freshwater threatens livelihoods linked to agriculture and forestry in an estimated 40 per cent of rural areas worldwide, while the heightened threat from climate change is increasing the likelihood of large-scale migration and relocation. It is estimated that up to 7 billion people could be at risk from increasing water stress by 2050 if action isn't taken soon.

Figure 1. **Levels of Water Scarcity Worldwide**



Source: Based on Ludi, Eva 2009. Climate change, water and food security. **Background Note.** Overseas Development Institute. March.

Many developing countries are already experiencing a major deficit in food production as soil moisture declines and the risk of water stress and drought increases. This situation will worsen owing to population growth and declining crop yields. Heat-related plant stresses are contributing to reduced yields in key crops, such as wheat, rice, maize and potatoes. It is estimated that basic crop growing capacity will have dropped by 10–20 per cent by 2080 in the 40 poorest countries (predominantly located in tropical Africa) owing to drought alone, while in many African countries, yields could drop by up to 50 per cent by 2020, with small-scale farmers being the most affected.

To illustrate the impact of water stress, competing claims (from agriculture and manufacturing) for water and waste-water discharge in Mozambique have resulted in a significant reduction in water quality and quantity in the coastal zone and significant impacts on the delta and mangrove forests. In addition, intense coastal dynamics (for example, wave actions, dispersion of sediments and strong winds and tides), combined with tropical cyclones and heavy rains, are worsening coastal erosion.

The Andean mountains rapid glacial melting threatens the water supply and livelihood of at least 30 million people. Large cities in the region such as Quito and La Paz, which depend on glacial run-offs for their water supply, are beginning to suffer. The loss in volume of the glacier surface of Peru, equivalent to 7,000 million cubic metres of water (about 10 years of water supply for Lima), has meant a reduction by 12 per cent of the water flow to the country's coastal region, which is home to 60 per cent of the population of Peru. As glaciers retreat, the capacity to regulate water supply through run-offs during dry and warmer periods and to store water in the form of ice during wet and colder periods is being lost.

In the Andean region, without sufficient run-offs, the pasture land will not be able to sustain small farming (including, for example, alpaca, llama and sheep herding). As the cultivation of native tubers and other staples, for example, potatoes and quinoa, is likely to dwindle, farmers may have to resort to planting costly staples that need chemical fertilizers. Most Andean countries are also dependent on glaciers for hydroelectric power generation, which accounts for 50 to 70 per cent of the energy supply. With rising temperatures, energy generation will be diminished in areas where water basins depend on glaciers.

Interrelated threats require integrated responses

Given the interrelated nature of climate threats, the costs of adaptation are likely to be high and solutions will involve difficult choices and trade-offs which will require access to sufficient resources and effective strategic planning.

Policy makers must look for more holistic and inclusive institutional responses that build in adaptation measures in to the wider development planning and budgeting process. These should start with an assessment of local vulnerabilities, look for synergies between adaptation and mitigation challenges, and seek out scale economies that can lead to cost savings.

Some countries have taken initial steps towards achieving a more integrated approach through National Adaptation Programmes of Action, with particular attention to water insecurity. For example:

- a large project in Cambodia aims to develop and improve community irrigation systems to address the risk of drought, which is linked to a prolonged dry season. As very little land in Cambodia is irrigated, this project aims to provide sufficient water for rice farming, reduce the risk of crop failures due to water shortage, and enhance food security and reduce poverty in the rural areas.
- the largest project in Eritrea's National Adaptation Programme of Action, in the north-western lowland characterized by low and extremely variable rainfall and a high frequency of droughts, aims to establish spate-irrigated cereal crop production systems, increase livestock production by improving the rangeland, restock the population of small ruminants, provide machinery and initial agricultural inputs, and establish effective community-based institutions. The project intends to reduce vulnerability to climate variability and drought and to cope with climate change in the long term through measures to increase crop productivity and provide fodder for livestock.
- the Government of Mozambique has drawn up massive plans for the sustainable development of the coastal region, and deal with climate risks in an integrated manner, across seasonal, inter-annual and multi-decadal time scales. These plans include major infrastructure investments (transportation, drainage and water supply), land-use changes, and soft options to manage beach erosion.

Climate-smart development

Long-term planning and investment are essential to prevent increasing vulnerability to climate change in developing countries. Tackling only the impacts will fail: fragmented action are only partial solutions. In managing climate change, it is important to avoid considering its impacts in isolation from other processes of change, such as urbanization and other demands on land and resource use.

Yet, while some developed countries are already investing in adaptation, developing countries by and large have limited technical and financial resource capacities and therefore face far greater challenges in implementing adaptation measures, especially those related to water management.

More innovative and predictable sources of multilateral funding are urgently required for meeting the adaptation challenge; the difference between the estimated size of resources needed, in the range of $50-100bn per year, and the amount actually mobilized and available, less than $200million, is staggering. Closing this gap is an urgent priority on the climate agenda. ■

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