WATER BRIEF

Climate, Water, Development: Asia Adapts through New Approaches and Investments

Climate change is not just an environmental issue; and responding to climate change is not just about turning to more efficient energy technologies. Climate change is also an economic issue and the poverty-stricken Asia and Pacific region must learn to cope with it now and prepare for a future of more change.

The Asia and Pacific region's water sector feels the impact of climate change in both environmental and economic ways. The subtle and significant evidences of climate change—such as mere variances in the frequency of rains to the onslaught of torrential rains, flash floods, and rising sea levels—demonstrate water's force on the landscape and on people's lives. Climate change affects the quality and availability of water supply from both ground and surface sources, which are the very lifeline to economic productivity of households, industries, and entire cities. When the climate acts up, the inconsistency in water supplies brings more economic uncertainty in the Asia and Pacific region.

How the World is Heating Up

Life-nourishing ecosystems are sustained through natural processes that keep the Earth's atmosphere livable. One of these processes, the greenhouse effect, is responsible for trapping part of the sun's heat in the atmosphere to make the Earth's temperature conducive for life. Naturally-occurring gases, such as carbon dioxide, methane, and nitrous oxide, enable the Earth's atmosphere to act like a greenhouse. However, unnaturally high amounts of these greenhouse gases (GHGs) can trap more of the sun's heat than is required, which can then heat up the Earth faster than nature and humanity's ability to adapt. High amounts of GHGs in the Earth's atmosphere result in higher global average temperatures and cause changes in precipitation patterns, increased frequency and intensity of storms, changes in vegetation, and a rise in sea levels.

In its 2006 major report, the Intergovernmental Panel on Climate Change (IPCC) said that most of the observed increase in GHGs was, in fact, due to human activities, such as the burning of fossil fuels, deforestation, agricultural practices, and manufacturing.

Why Water Matters in Climate Change

Changes in the Earth's climate will adversely affect the different regions of Asia in varying ways. In general, the impact of climate change will reduce crop yields by 2.5–10% by 2020, putting 132 million people at risk of extreme hunger by 2050. More region-specific impacts are anticipated:

- In **Central, East, South, and Southeast Asia,** especially in large river basins, there will be a decrease in fresh water, affecting more than 1 billion people by 2050. Glacial meltdown will cause more devastating floods and slope destabilization. Glacial recession will decrease river flows.
- In **South and Southeast Asia,** a rise in coastal water temperature will exacerbate the toxicity of cholera and increase endemic morbidity and mortality from diarrhea and other related diseases.
- In **North Asia,** natural habitats of vector and water-borne diseases are likely to expand.
- **Coastal and marine ecosystems throughout Asia and the Pacific** face threatened wetlands, mangroves, and coral reefs—with 24–34% of coral reefs likely to be lost by 2050. Brackish water will affect aquaculture.
- **The Asia and Pacific region's coastal megacities** face increased flooding, which will affect millions of people and put infrastructure investments at risk.

Developing Asia and the Pacific Region Bears the Brunt

Water should play a crucial role in the developing world's climate change agenda. Developing countries have more than enough water problems—scarcity, pollution, and water-related disasters, among others. Adding climate change to the equation makes the dream of sustainable development, particularly access to safe drinking water and improved sanitation, doubly difficult to achieve.

Developing countries are more vulnerable to the negative impacts of climate change because of their limited capacity—human, financial, and institutional—to

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adapt to extreme events. People in the Asia and Pacific region's developing countries, especially the poor people of small island states, coastal, and delta areas, face the most serious impacts of radical climate change. The health, safety, and livelihoods of people, particularly in low-lying Pacific island countries, have become the world's greatest concerns. Climate change, as both an environmental and an economic development issue, is one of the most formidable challenges that the Asia and Pacific region faces today.

Mitigation and Adaptation

Climate change mitigation often refers to initiatives to reduce GHG emissions by switching to cleaner and more efficient technology and uses of energy. Climate change adaptation, on the other hand, refers to initiatives to help people cope with the inevitable change they face from rising temperatures, droughts, and more frequent storms. The *2006 Stern Review,* a report that discusses climate change's effects on the world economy, estimates that even under the best case scenario, adaptation measures will cost developing countries $10 billion annually. This includes necessary infrastructure adjustments in response to floods, storm surge, water shortages, cyclones, and other climate change risks.

International organizations have an important role to play in providing technical advice and access to financing. The Asian Development Bank's (ADB) adaptation program is responding in three ways:

- **National adaptation planning** through better analysis of climate change consequences at the national and local levels, and identification of cost-effective measures to improve the resilience of infrastructure and vulnerable populations;
- **Project-level "climate proofing"** of existing infrastructure and future project designs will gradually become routine to ensure that physical and hydrological assumptions consider predicted changes in precipitation patterns, the severity and frequency of storms, and other impacts; and
- **Specific adaptation investments** as defensive measures or steps to reduce the risks from increased flooding, storm surge, drought, wind damage, head waves, dust storms, and other anticipated impacts of climate change.

Taking on the Climate Change Challenge

The real and emerging threat of climate change will affect both faces of Asia—growth may be jeopardized and poverty further exacerbated. Without water, no community or country can flourish. The impacts of climate change must be diligently studied and proactive measures taken to make the region more resilient.

One of ADB's challenges is to help the region become less vulnerable to natural climate variability and human-induced climate change. With ADB's assistance, countries should be able to integrate climate variability and climate change considerations into national economic development and sectoral strategies of water, agriculture, human health, and coastal zone management.

On the whole, climate change is likely to introduce high levels of risks and uncertainties that the water profession may not be able to handle effectively, at least in the short term. More research and capacity development will be needed if serious water-related stresses and climate change vulnerabilities are to be avoided.

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ADB's Climate Change Adaptation Assistance to Developing Member Countries

- ADB has provided technical assistance to South Pacific countries to create practical guidelines on climate proofing of infrastructure, such as Avatiu Harbor of the Cook Islands and road development projects in Kosrae, Federated States of Micronesia.
- The ADB-led Central Asian Countries Initiative for Land Management is helping the countries of that arid region adapt through drought-resistant crops, improvements in irrigation efficiency, water resource management, watershed protection, and other measures.
- In Indonesia's Citarum River Basin, more than $3 billion will be invested in upgrading water resources management infrastructure and institutions over the next 15 years under an ADB-led program. A parallel analysis will examine areas of climate proofing or specific investment required to adjust to the added risks from climate change.
- Through an ADB–World Bank–Japan Bank for International Cooperation Initiative on Climate Impact and Adaptation in Asian Coastal Cities, ADB is supporting an analysis of future climate conditions in Bangkok, Ho Chi Minh, Jakarta, Karachi, Kolkata, and Manila, and assisting local government to adapt their investment plans to those future conditions.