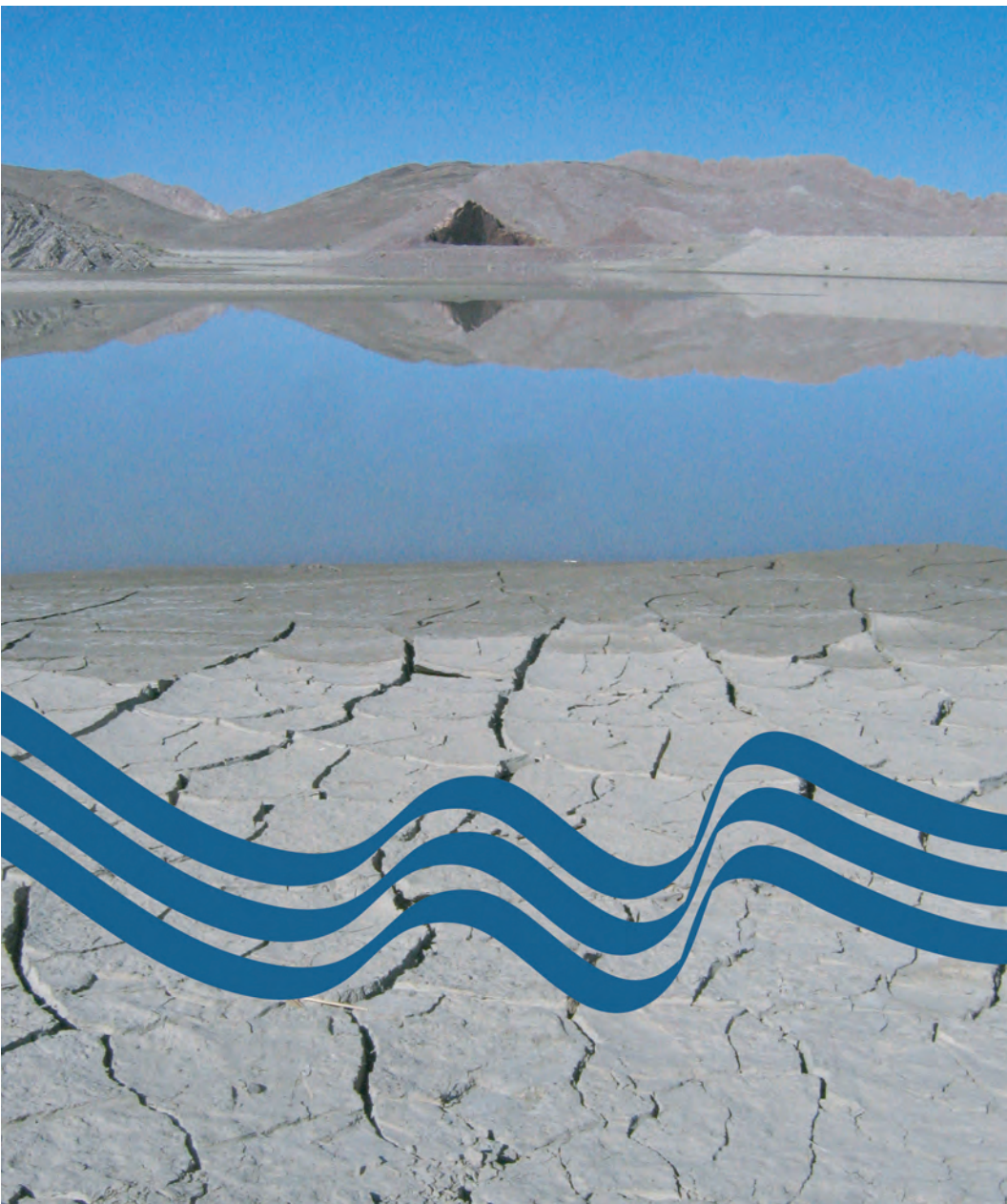




Government of Pakistan
Ministry of Environment

CLIMATE CHANGE

Water Vulnerabilities in Pakistan



INTERNATIONAL UNION FOR CONSERVATION OF NATURE

DFID Department for
International
Development





Climate Change Water Vulnerabilities in Pakistan

Pakistan has a unique water situation. It receives most of its rainfall during the monsoons (July-August), with little rainfall in winter. The snowfall in its northern region determines the health of its glaciers. Projected climate changes due to global warming, which will increase temperatures by 2-3 degrees by the 2040's and 5-6 degrees by the end of the century, and much reduced but intense bouts of monsoon rains will seriously undermine its water resources.

Pakistan's glaciers are situated in the Himalayas, the Hindukush and the Karakorums, which boast some of the highest mountain peaks in the world.

The World Bank study 'Pakistan's Water Economy Running Dry (2006)' stated:

"Western Himalayan glaciers will retreat for the next 50 years causing increase of Indus River flows. Then the glacier reservoirs will be empty, resulting in decrease of flows by up to 30% to 40% over the subsequent fifty years."

Pakistan has a highly integrated river basin system in the form of the Indus. This system is the largest contiguous irrigation network in the world, but also the most

Distribution of Water in Main Rivers of Pakistan

% of IRS inflows		% Seasonal Distribution		Dominant Source in Summer	Dominant Source in Winter
		Summer (Apr-Sep)	Winter (Oct-Mar)		
Indus	44	86	14	Snow/Glacial melt	Winter Rainfall + Baseflow
Chenab	19	83	17	Snow/Glacial melt + Monsoon	Winter Rainfall + Baseflow
Jhelum	16	78	22	Mainly Snow melt + Monsoon	Winter Rainfall + Baseflow
Kabul	16	82	18	Snow/Glacial melt	Winter Rainfall + Baseflow
Others	15				



vulnerable to Climate Change. Given its ageing canals and waterworks—it is in desperate need of investment and overhaul.

Climate Change induced water issues:

- Highly variable river flows, with reduced precipitation
- Water tables in certain areas rapidly lowering by more than 20 ft/annum due to over-exploitation and mismanagement
- Increasing demand for water due to high population growth rate
- Hydro-power variations and electricity load-shedding
- Poor maintenance of canal system
- Water-logging and salinity
- River contamination
- Lack of inter-provincial consensus on water development strategy
- Water pricing
- Water rights and entitlements poorly defined

Besides these issues there are looming water wars with neighboring countries. Climate change will test the mettle of past treaties and will create situations of both excessive releases of waters during floods and diversion of flows by the upper riparian.

Water Scarcity: Pakistan is now considered amongst the most water-scarce countries in the world.

Pakistan has only 3 major reservoirs, in the form of the Tarbela, Mangla and Chashma dams, which can store 15.6 MAF of water, currently reduced to 12.8 MAF. The United States has 5,000 cubic meters of storage capacity per capita while Pakistan has only 150 cubic meters of storage per capita.

Likewise, India can store up to 220 days requirements of its river water. By contrast Pakistan can store only 30 days of water in the Indus Basin. Even this capacity is rapidly being depleted as the dams silt up.

Inadequate per capita water availability has already reached critical levels. As almost 90% of the water is used by the agriculture sector, human populations suffer greatly due to shortages of water and high differential pricing.

The use of bottled water is an emerging trend. Poorer segments of the population still consume polluted water, and water-borne diseases are a major cause of mortality and



morbidity. Climate Change will further expose populations to malaria, dengue, filariasis and schistosomiasis.

Adaptation actions required:

- Enhance water storage capacity
- Encourage rain harvesting in water-critical areas
- Shift to less water-intensive crops
- Create awareness of necessity of water saving
- Develop water resource planning and modeling capacity
- Regulate ground water use
- Improve governance, trust, transparency in water sharing
- Manage demand through a rational pricing mechanism
- Implement waste-water management and recycling in urban areas
- Introduce low-cost filtration technology for clean drinking water

Costs of Climate Change:

Adapting to water shortages due to Climate Change will be economically and socially costly. Preliminary estimates suggest that Pakistan would need almost US \$50 billion over the next 20 years to revamp its infrastructure, put in more storage, provide clean drinking water, promote water conservation technologies, create mass awareness and get its water woes under control for sustained economic growth.

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