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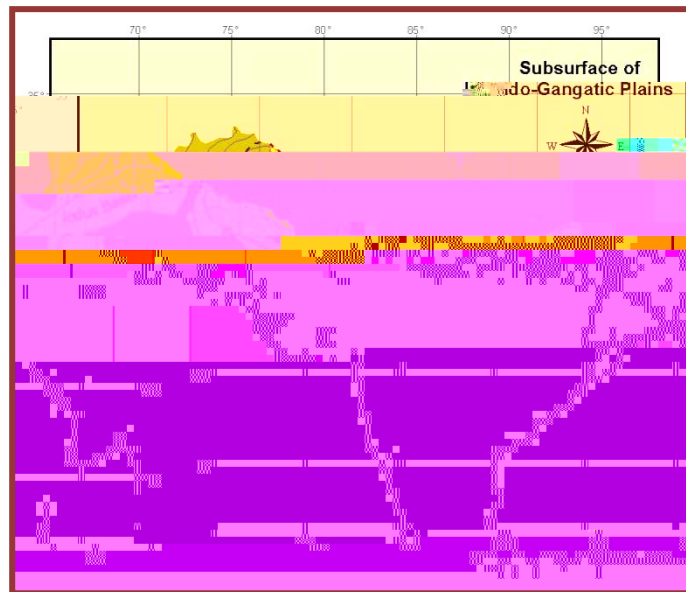
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BEYOND INDUS WATER TREATY: GROUND WATER AND ENVIRONMENTAL MANAGEMENT – POLICY ISSUES AND OPTIONS

1. THE CONTEXT

1.1. Indo-Gangetic River Basin (IGRB)

Length of the **Indus River** is 3,199 kms. In the Upper Indus Basin, the principal tributaries are Kabul, Swat and Kurram on the right bank and Jhelum, Chenab, Ravi, Beas, and Satluj on the left bank (**Figure 1**). The basin extends over an area of 1.166 million km² and its distribution covers: Pakistan 0.693 km²; Afghanistan and China 0.015 km²; and India 0.321 km². The mean annual flow of the Indus Basin is 187 km³ contributed by runoff, snow- and glacier-melt. Catchment area of the Ganga River falls in India, Nepal, China, and Bangladesh and its length is 2,525 kms. Yamuna is the most important tributary that joins it on the right bank at Allahabad. After confluence with Yamuna, the Ganga River flows eastward and is joined by a number of tributaries.



1.2. Surface Water Resources in the IGRB

IGRB drains from southern Himalayan and Hindu Kush “Water Tower of Asia” and provides base for economic development for over a billion people. The projected per capita water availability in the Indus-Pakistan and Ganga-India sub-basins by 2025 will be reduced to < 1000 m³ – water scarce sub-basins. The Indus-India sub-

1.4. Groundwater and Environmental Management by the Basin States

Over-

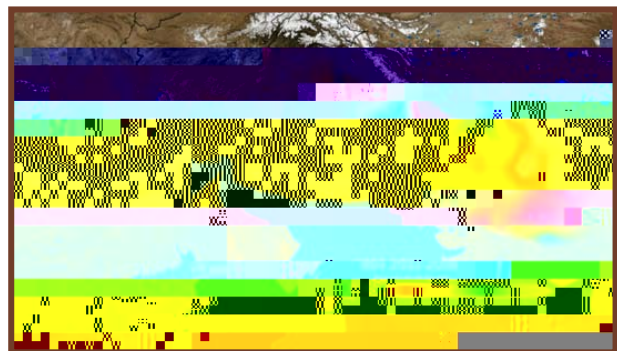


Figure 3. Groundwater vanishing in Northern India⁶

There is no excessive abstraction of groundwater in Pakistan, except in a smaller strip along the border, which seems an extended impact of the mining of groundwater in India. Otherwise, there is no region of groundwater depletion in Indus-Pakistan. Even excessive groundwater abstraction in India has affected Nepal from both sides of the Indian border.

The study does not provide information regarding absolute volume of water in the Northern Indian aquifers, but it provides strong evidence that current rates of groundwater abstraction are not sustainable. The region has become dependent on irrigation to maximize agricultural productivity, so the authors predicted water crisis in the near future.

The study findings raise an issue that how the aquifers of Indus-Pakistan are going to be affected with the excessive abstraction of groundwater on the Indian side. What are the implications on Pakistan side aquifer both in quantity and quality terms is a major question to be addressed? The issue of trans-boundary groundwater with India has to be addressed and an addendum has to be

Seepage losses contribute to groundwater and plantations around the Lake are also consuming water. The Wular Lake and Kishenganga Project would further

4. POTENTIAL OPTIONS

4.1. Dialogues for Addressing Transboundary Aquifer's Management

Emphasis must be placed on the basin aquifer bordering the basin states in future discussions of the Indus Water Commission. With the scarcity of surface water and persistent drought the pressure on groundwater will increase and there are chances that condition of aquifers will be further aggravated. Pakistan may take up the issue of trans-boundary aquifer with India before it is too late, as in Indus-India aquifer is under heavy depletion.

Initiate dialogues between the basin states for transboundary aquifer management through: a) sharing information on aquifer abstraction; b) ensuring that electric and diesel fuel policies are not encouraging farmers for over-abstraction of groundwater; c) developing capacity of the basin states for the use of remotely sensed data for the assessment of water table and groundwater abstractions; and d) exchange of knowledge and technologies for efficient use of water to reduce dependence on groundwater through the management of water demand for all sub-sectors of water use.

4.2. Managing Groundwater as a Resource as well as Trust

Manage groundwater as a resource, as it is essential to jointly set up an organisation with representatives from the basin states, whose functions would entail identifying short- and long-term supply capacity of the basin and its integrated development, setting up of infrastructure and coordinating activities of different agencies. Furthermore, **groundwater must also be considered as a trust** because in a concept of trusteeship, resource is not only depleted but it is also recharged to manage it on sustainable basis. As in the basin states, surface water schemes are largely being managed on *Warabandi* (fixed-rotation) and water allocations are actually based on rationing of water, therefore groundwater provides water on demand basis and hence it has larger impacts on productivity of irrigated agriculture.

4.3. Support Paradigm Shift in the Mindset of People

Support paradigm shift in the mindset of people of the basin states and it would require a complete end to hostilities, both physical and psychological, from both sides. It will have to be a part of the final settlement in letter and spirit. The integrated development approach is beyond consideration in the current context of relations between the basin states, but all other options will lead to destruction sooner or later. Furthermore, trans-boundary water and aquifers have to be seen in terms of opportunities available to manage water (surface, groundwater and wastewater), while developing future plans for the benefits of the basin states.

4.4. Monitoring of Hydro-power Projects on the Western Rivers

Monitor river flow projects in terms of seepage losses due to heading up of water in the reservoir, where seepage is induced by many-fold. This will be a loss to Pakistan but a gain to India. Therefore, water apportionment to India on the western rivers in terms of storage has to be seen in the context of induced seepage losses. Depletion of groundwater in northern India will pose serious implications for India to try to use surface waters from the western rivers over and above the provisions of the Treaty, being an upper riparian. In addition, the seepage of water from the storage projects can be easily estimated by measuring the inflow to the reservoir. The seepage loss can be estimated by measuring the difference between the inflow and the outflow of the reservoir. The seepage loss can be estimated by measuring the difference between the inflow and the outflow of the reservoir.

5. Way Forward

Who will be the Champions of creating a shift in the mind set of the experts and people to consider environmental concerns and groundwater issues and to formulate detailed provisions on trans-boundary aquifers and environmental pollution so that

