



## Groundwater laws in the Indus basin

### Key messages

- ✎ **Unsustainable groundwater use in the Indus basin threatens the quality and availability of the resource, and has far-reaching transboundary repercussions;**
- ✎ **There is no legal arrangement between India and Pakistan – or any of the Indus basin's riparian States, with respect to groundwater;**
- ✎ **International water law is moving towards promoting sustainable and equitable utilization of transboundary groundwater, in conjunction with surface water resources;**
- ✎ **Control and regulation of groundwater is weak at the federal/union and province/state levels in India and Pakistan;**
- ✎ **Reliable and shareable measurement, quantification and assessment of the Indus River plain aquifer is necessary for groundwater policy formulation and legal regulation of transboundary groundwater in the Indus basin.**
- ✎ **Further research needs to be conducted on all basin riparians and socio-economic aspects of groundwater, including gender dimension.**

### Introduction

The Indus basin straddles the India-Pakistan border and is underlain by the Indus River plain aquifer, a 560,000 square kilometer (km<sup>2</sup>) confined to semi-confined porous alluvial formation. In India, the States of Jammu and Kashmir, Himachal Pradesh, Punjab, Rajasthan, Haryana and Chandigarh, fall wholly or partly in the Indus basin. In Pakistan, all four provinces fall wholly or partly in the Indus basin.

Information collected by the Gravity Recovery and Climate Experiment (GRACE) satellite mission between August 2002 and October 2008, of changes in the territorial water storage in the region of Rajasthan, Punjab, Haryana and the National Capital Territory of Delhi, is an evidence that withdrawals through irrigation and other uses depleted the groundwater reserves of Rajasthan, Punjab and Haryana. Time-lapse images of the information collected indicates that groundwater extraction in India may be affecting groundwater in Pakistan.

It has been documented that groundwater flows in the Indian Punjab and Haryana are in the western to south-western direction, in the direction of Pakistan. Groundwater withdrawals from the Indus basin from those Indian States and Pakistani provinces falling within the basin totaled 62.7km<sup>3</sup> and 61.6km<sup>3</sup> respectively, across the Indus basin. Groundwater accounts for 48 percent of the total water withdrawals.

There is, clearly and demonstrably, a groundwater and aquifer relationship between India and Pakistan. Both countries have entered into the Indus Waters Treaty, 1960, recognizing mutual rights over the waters of the eastern and western rivers of the Indus basin (excluding the River Kabul). However, the Indus Waters Treaty, 1960 IWT is primarily a surface water document that regulates the construction of dams by India on the western rivers of the Indus basin. Such regulation does not extend directly to groundwater or the complex issues related to groundwater.

The IUCN report on water cooperation to manage groundwater lays out a tentative set of key policy issues that have impacts on the sustainability and inter-generational issues of Indo-Pak transboundary aquifers. These are, briefly:

- ✎ Depletion of aquifers in Northern India and their Impact on Pakistan's aquifers;
- ✎ Entry of effluents into western rivers of the Indus basin;
- ✎ Growing demand of surface water to recharge aquifers of Indus basin; and
- ✎ Seepage losses in lakes and reservoirs.

Considering the issues regarding the use and pollution of the Indus basin aquifer, it is necessary to determine what laws and legal framework operate in India and Pakistan, to serve as guidelines in addressing and resolving issues.

### Groundwater laws in the Indus basin

A study of the Indian and Pakistan groundwater laws reveals points of convergence and divergence on rights, control and management. The constitutions of both countries respect the

legislative competence of the states/provinces on groundwater. However, in practice, India and Pakistan have mechanisms that allow the union/federal government control over groundwater.

In India, the Central Ground Water Board

exercises control over groundwater in the areas notified for regulation. The Central Ground Water Authority established under the Environment (Protection) Act, 1986 has power to regulate and control the boring and withdrawal of groundwater in India. This power extends to issuing directions and measures that include, inter alia, execution of the nationwide programmes for the prevention, control and abatement of environmental pollution and other measures, as the central government considers necessary. The Central Ground Water Authority consists of ex officio representation from the Central Ground Water Board, which has considerable capacity and experience in monitoring groundwater in India. The Government of India, through the Ministry of Environment and Forests, can formulate a policy or give instructions to the Authority to collaborate. In Pakistan, the Council of Common Interests can set policies, upon which the Water and Power Development Authority (WAPDA) can develop and implement schemes in relation to groundwater.

Indian and Pakistani legislations diverge at the state or province levels. Though, India and Pakistan inherited a system of canal irrigation and management from the colonial period, the irrigation laws applicable in each province or state have divergent approaches to groundwater. In India, state irrigation legislation does not cover groundwater. The provincial governments of the Punjab and Sindh provinces in Pakistan have jurisdiction to use sub-soil water in an existing or proposed canal within the irrigation network.

In Pakistani Punjab, the Irrigation Act, 1873, entitles management of the sub-soil water to the provincial government, and a 2006 amendment gives responsibility for the management of the aquifer to the provincial government. The Government of Punjab is thus made responsible to evaluate the condition of the aquifers, and may draw up schemes for their proper management. The Punjab Soil Reclamation Act, 1952, delegates authority to the Government of Punjab to undertake schemes for reclamation of large areas affected by salinity and waterlogging. Further, the Punjab Irrigation and Drainage Authority Act, 1997 delegates authority to the Government of Punjab over groundwater resources, to manage schemes developed under the Act. Thus, the groundwater legislation in the Punjab, far more markedly than in Sindh, gives the Government of Punjab, entitlement to the use, control and management of the aquifer and groundwater.

In India, state level legislation over groundwater differs from state to state. For example, there is no state-level legislation on groundwater in Jammu and Kashmir and Rajasthan. On the other hand, Indian Punjab and Haryana have taken the indirect measure of conserving groundwater, through restriction on the paddy plantation, and not by an assertion of the right to control. In Himachal Pradesh, for example, there is a specific groundwater legislation that authorizes the state government to regulate the extraction of groundwater.

The constitutions and laws in India and Pakistan envisage a significant role for local governments in the protection and preservation of water sources including, presumably, aquifers and groundwater, as well as the construction, operation and maintenance of drinking water infrastructure. The constitutions

envisage local level decision making in relation to groundwater. However, in practice, the local governments in India and Pakistan seldom have had the financial, technical or operational capacity to fulfil their responsibilities.

It is noted that the local governments in Pakistan have a far greater role in groundwater management than in India. In Pakistan, local government legislation in Sindh and Punjab gives local governments (and, in Punjab, Development Authorities as well) control over private sources of water supply including, presumably groundwater, in their local areas. Such control has not been conferred to the local governments in India.

The comparable lack of state control over groundwater in India and the enhanced control over private sources of water by local governments in Pakistan, perhaps reflect the most significant difference in the approach to groundwater law in both jurisdictions: the personal right to groundwater. In India, owner of the property, over which an aquifer lies, has the right to its groundwater. In Pakistan, the legislative control of the provincial and local government authorities over water is in conflict with the personal right of land owner over groundwater in India.

The superior judiciaries of India and Pakistan have recognized that clean drinking water is a fundamental right. Both jurisdictions have also developed the concept of "public trust", when dealing with natural resources, such as water.

However, it should be noted that the fundamental right to clean drinking water is not a right to groundwater. It is instead, a right to the equitable access to adequate quality drinking water. It is also pointed out that, the concept of 'public trust' in the Indian jurisdiction has been developed over surface water, though one case has already mentioned bringing groundwater under the purview of public trust. In Pakistan, on the other hand, the concept of 'public trust' was developed in a case specifically dealing with water being extracted from the aquifer for commercial purposes, and so addresses groundwater, specifically. Regardless, the concept of public trust in the both jurisdictions suggests that natural resources like air, sea, water and forests are public trusts; and that the doctrine of public trust enjoins onto the government the fiduciary duty to protect such resources from misuse and over-exploitation, and to ensure such resources are utilized by the general public, rather than allowing their private ownership. The trustee can neither alienate the trust, nor can it fundamentally change its nature.

The government, as a trustee of the natural resource of groundwater, is thus under a duty of care and responsibility to the general public, to ensure the distribution of water from the aquifer neither deprives any individual or group from access to domestic water, nor significantly affects ecosystem needs. Considering the control and regulation of groundwater, India and Pakistan exercise at the federal/union, province/state and local levels, it is imperative that the trustee manages at multiple levels. The role of the local government needs to be properly appreciated within this scheme of management.

## Development of international transboundary groundwater law

Neither India nor Pakistan have ratified the United Nations Convention on the Law of Non-Navigational Uses of International Watercourses (the 'UN Watercourse Convention'). However, its provisions are not binding upon either. This means, the provisions of the UN Watercourse Convention, and the various rules adopted by the International Bar Association are not binding on both countries, in relation to the groundwater in the transboundary aquifers shared by both countries. Nevertheless, the UN Watercourse Convention and the rules provide a highly developed framework. India and Pakistan may cooperate over the use of their shared groundwater, under its general principles. A summary of some of the main principles that can be derived from this framework are:

1. Basin States to utilize shared aquifer in an equitable and reasonable manner, with a view to attaining optimal and sustainable utilization, thereof. Factors relevant to equitable and reasonable utilization include:
  - (a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
  - (b) The social and economic needs of the concerned watercourse States;
  - (c) The population dependent on the watercourse in each watercourse State;
  - (d) The effects of the use or uses of the watercourses in one watercourse State on other watercourse State/s;
  - (e) Existing and potential uses of the watercourse;
  - (f) Conservation, protection, development and economy of use of the water resources of the watercourse and the costs of measures taken to that effect; and
  - (g) The availability of alternatives of comparable value to a particular planned or existing use.
2. Basin States are obliged not to cause significant harm to the other and, in this regard, are to consider the establishment of mechanisms to facilitate cooperation.
3. Basin States shall regularly exchange data and information on the shared aquifer and watercourse.
4. Basin States shall be responsible individually and, where appropriate, collectively, to protect the ecosystem and marine environment of the shared watercourse, and take measures to prevent, reduce and control the pollution of the same. For this purpose, Basin States may arrive at mutually agreeable measures to prevent and control pollution.
5. Obligation to use and manage groundwater conjunctively with surface water, taking into account interconnections.
6. Basin States shall notify one another of any planned measures to be taken on their part of a shared watercourse, and remain under an obligation to take any reply into bona fide consideration.

7. Where Basin States cannot negotiate out of a difference on any planned measure, they may establish a fact-finding Commission, whose report will be considered, bona fide, by them.

## Transboundary groundwater cooperation in the Indus basin

It can be attempted to incorporate groundwater cooperation into the Indus Water Treaty, 1960, by introducing an amendment, clearly defining rivers to include related aquifer systems. Thus, the Treaty could apply to aquifer systems connected to the waters of the western rivers. However, it would not solve issues related to aquifer systems of the eastern rivers, whose waters have been allocated to India. In any event, the fierce interaction on issues related to the Treaty, not least related to reliable information sharing, makes the type of cooperation envisaged for research into transboundary aquifers, practically impossible.

There can be no proper policy or legal regulation in the absence of reliable information about the nature and characteristics of the Indus river plain aquifer. Joint or shared studies or measurements of the aquifer, either by government agencies in both countries or by academic institutions or NGOs are required to provide correct information to policy makers, needed to undertake any cooperative measures.

Further research needs to be conducted on all basin riparians. It is only possible, when the groundwater laws of Afghanistan and China are also understood. This will enable proper basin-wide understanding of the varying legal regimes and will help identify institutions that could participate in prospective Indus Basin cooperation on ground water.

Further research on groundwater is needed in the context of social and economic rights. Issues such as public health, reproductive health, water and sanitation, for example, are all tied to the use and contamination of groundwater, as a source of drinking water. The strength of the legal regime regulating groundwater can be assessed against their efficacy in meeting Millennium Development Goals or Sustainable Development Goals or other such indicators.

Almost no research exists in understanding the gender dynamics that play out in the laws and regulations of groundwater in the Indus basin. Water is consumed by women, who constitute half the population, and yet none of the laws surveyed carried any special mention or protection for women, who interact with water on a daily basis. A gendered critique of laws and the regulatory system would shed new light on the dynamics of water law in the region.

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## About the publication

Consistent with its history of providing thought leadership, LEAD Pakistan, supported conducting of a study on 'Legal Analysis of Issues, Challenges and Opportunities in Indo-Pak Transboundary Groundwater Cooperation.

This policy brief, derived from this paper, shares policy implications on groundwater management in Pakistan. Under our occasional paper series on transboundary waters, it is the first of its kind review that brings to the fore, the issue of much neglected transboundary groundwater that is currently being shared between Pakistan and India. This paper gives an insight into the institutional and governance structure that exists in both the countries, thus providing a baseline for further analysis in this area.

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These integrated efforts led to the conducting of research on the issue of much neglected transboundary groundwater that is currently being shared between Pakistan and India.

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