Legal Analysis of Issues, Challenges and Opportunities In Indo-Pak Trans-Boundary Groundwater Cooperation
LEAD Pakistan

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Jammu Kashmir is a disputed territory and Jammu Kashmir mentioned in this publication refers to the Indian held Jammu and Kashmir
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Foreword

The topic of transboundary ground water has not enjoyed the exalted status of transboundary surface water resources. However, with increased emphasis on ground water resources, especially during times of drought, there is an increased interest in the nature and extent of transboundary ground water resources and the development of agreements governing their use and protection.

The existence of transboundary aquifers between India and Pakistan has been investigated comprehensively. Conflicts may arise due to the unsustainable utilization or contamination of these aquifers. However, measures can be agreed upon to manage the aquifer on a joint basis to obtain the maximum benefits for each of the parties without jeopardizing the integrity of the aquifer to the detriment of future beneficial use by any one of the parties involved.

An important legal and institutional arrangement in the form of Indus Water Treaty (1960) between India and Pakistan for conflict resolution is in place, when it comes to the use of shared surface water resources. However, the joint management of shared ground water resources is an area that needs to be explored possibly leading to an accord between the two neighbours.

This is the first publication in our Occasional Papers series on transboundary waters. It is the first of its kind review that brings to the fore, the issue of much neglected transboundary ground water that is currently being shared between Pakistan and India.

This research work concerning the management of shared ground water resources identified the need for cooperation in the management of those resources and one of the major constraints is putting the management structures in place. The objective of this paper is to briefly discuss the existing legal and institutional arrangements in place in both the countries that could be utilized or modified to implement effective transboundary ground water management. 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.

It is high time that both countries must work side by side to address this challenge, which though regional in nature, has deep and wide ranging local impacts. And raising awareness at the government level about transboundary ground water issues must go hand in hand with collecting relevant information about each area specific groundwater concerns that need to be addressed; capacity-building and engagement with planners and policy-makers must be enhanced and new ‘out of the box’ ideas like a few shared in this study must be tested.

Please do share your critique and suggestions about this research which we shall try to incorporate either in a subsequent related study, or if possible, in the next edition of this publication.

Ali T. Sheikh
CEO, LEAD Pakistan
A. Introduction

The India-Pakistan border is underlain by the Indus River plain aquifer, a 560,000-km² confined- to the semi-confined porous alluvial formation. 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 Indian states of Rajasthan, Punjab, Haryana and the National Capital Territory of Delhi, proved that the water withdrawals for irrigation and other uses were heavily depleting the groundwater reserves of these regions. Time-lapse images of the information collected indicated that groundwater extraction in India might be affecting groundwater in Pakistan. The present study explores the issue further particularly focusing the legal dimensions. However, the purpose of this paper is not to "prepare a case" for Pakistan but to prepare a case for transboundary cooperation on groundwater based on an understanding of the existing legal systems in India and Pakistan, principles of international law and shared and reliable information about the characteristics in the Indus River plain aquifer.

B. Groundwater in the Indus Basin

The Indus Basin straddles the Indo-Pak border. 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. This paper considers the groundwater law and legal institutions in India and Pakistan, particularly in the States and Provinces that adjoin across the international border; namely Jammu and Kashmir, Punjab and Rajasthan in India and Punjab and Sindh in Pakistan. The States of Himachal Pradesh and Haryana in India are also touched upon due to the number of tributaries of the Indus Basin that flow through them and the groundwater extraction that takes place there.

It is well documented that groundwater flows in Indian Punjab and Haryana are in the western to southwestern direction, towards Pakistan. Groundwater withdrawals
from the Indus Basin from those Indian States and Pakistani Provinces falling within the Basin totaled 62.7 km³ and 61.6 km³ respectively. Across the Indus Basin, groundwater accounts for 48 percent of total water withdrawals.4

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 one another’s rights over the waters of the Eastern and Western Rivers of the Indus Basin (excluding the River Kabul). However, the Indus Waters Treaty, 1960 (the “IWT”) is primarily a surface water document that regulates the construction of dams by India on the Western Rivers of the Indus Basin. Such a regulation does not extend directly to groundwater or the complex issues related to groundwater. As such, this paper does not consider the IWT in detail save to point out where its framework may offer the potential of meaningful interaction on groundwater.

This paper assumes immense pressure on groundwater as a finite natural resource in South Asia. The Indus Basin Working Group report provides an overview of some of the groundwater issues in South Asia.5

In addition to sharing the Indus’ surface waters, India and Pakistan also share important-though inadequately mapped and characterized-transboundary aquifers in the basin. Groundwater constitutes an essential additional source of freshwater for the region. Groundwater and surface water resources in the Indus Basin are closely linked both hydrologically and socio-economically. Hydrologically, seepage from surface sources-such as rivers and irrigation canals-contributes to recharging subterranean aquifers, while groundwater flows similarly enter and augment surface streams. By some assessments, 45 percent of Pakistan’s renewable groundwater supply originates in leakage from the canal system, 26 percent comes from irrigation return flows, and six percent derives from river recharge. In India, an estimated one-fifth of the surface water withdrawn from the Indus for irrigation subsequently drains into groundwater aquifers as return flow. Socio-economically, many water users in the basin rely on groundwater to supplement or supplant surface water supplies where these prove inadequate, intermittent, or unavailable. Over 40 percent of the irrigated land area in Pakistan, for example, is irrigated from mixed surface water and groundwater. For many cities in the basin, groundwater is the principal or unique source of municipal water supplies. In India, groundwater abstractions in those states situated wholly or partially within the Indus Basin-Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, and Rajasthan-account to 62.7 km³. Pakistan’s annual groundwater withdrawals from the basin totaled 61.6 km³ in 2008, or one-third of all national water use. Across the Indus Basin, groundwater accounts for 48 percent of total water withdrawals.

India and Pakistan are likewise rapidly depleting the basin's groundwater resources. Indeed, extractions from the Indus aquifers reflect both the most intensive and the most unsustainable levels of groundwater exploitation on Earth. Studies in Pakistan reveal water tables plummeting by two to three meters a year, with groundwater levels falling to inaccessible depths in many wells. Because groundwater salinity in these aquifers typically increases with depth, dropping water tables leads farmers to irrigate with ever more saline water, salinizing the soils and degrading their production potential. Salt-affected soils now impact 4.5 million hectares, amounting to over 22 percent of Pakistan’s irrigated lands. Similarly, a review by India’s Central Groundwater Board determined that overdrafts exceeded rates
of recharge in 59 percent of the administrative units monitored in Haryana, 80 percent of units in Punjab, and 69 percent of units in Rajasthan. Around the region, yearly groundwater withdrawals equaled 127 percent of the total renewable supply in Haryana, 170 percent in Punjab, and 135 percent in Rajasthan. As a result, the Indus Basin is losing water. Estimates based on satellite data indicate that the basin aquifers lost groundwater at a rate of 10 km³ per year between April 2002 and June 2008, an annual debit representing more than half the combined capacity of India’s six large dams in the Indus system, or almost half the available water storage in all the reservoirs of Pakistan.

An 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.

Given the issues surrounding the use and pollution of the Indus Basin aquifer, it is necessary to determine what laws and legal framework operate in India and Pakistan and in specific in those States and Provinces that share an aquifer that may be of help in addressing and resolving these and other issues.

This paper proceeds by introducing the concept of transboundary groundwater and then surveying the existing legislation and case law on groundwater in India and Pakistan. Special attention has been given to the States and Provinces listed above, relating to groundwater as well as jurisprudence developed by the Superior Judiciary. This paper evaluates the existing laws in light of challenges facing the management and governance of groundwater. It then details some aspects of transboundary aquifer governance and will summarize existing international law related to transboundary aquifers. It will assess the value of international law on transboundary aquifers to the existing situation between India and Pakistan and will conclude by providing a list of policy options and possible future areas of cooperation between India and Pakistan on groundwater management. The paper will also discuss the limited role of the IWT in relation to the complex issue of transboundary groundwater.

C. The Concept of Transboundary Groundwater

Groundwater is normally transboundary. While 276 international watercourses traverse the world’s land areas, at least 448 aquifers and aquifer bodies traverse international political boundaries. Despite their importance, there has been limited consideration of transboundary aquifers in international law and only a limited number of agreements on transboundary aquifers exist. The inadequacy of scientific data and complexity of the issues of groundwater are often quoted as the reason for this lack of attention.

“[O]f all the words in the hydrological vocabulary, there are probably none with more shades of meaning than the term aquifer.” Broadly, however, “An aquifer is best defined as a saturated geologic unit that can transmit significant quantities under
ordinary hydrological gradients. The uncertainties of the physical properties of aquifers attempt at legal definitions, let alone groundwater management and governance challenges.

Groundwater is a dynamic resource that bucks the two-dimensional analysis commonly employed in the management of surface water. With groundwater, water percolates into the soil, drawn by gravity, and thus moves in more than one plane. The three-dimensional approach better takes into account the various interdependencies of groundwater and its complexity of behavior.

The ambiguous physical nature of an aquifer makes groundwater management between States especially difficult, as the management of the resource rests with more than one sphere of control. At least five different cases can be used to illustrate the varying nature of groundwater management and governance:

1) a State-owned aquifer in which the entire aquifer is within one State;
2) a confined aquifer divided by the international boundary;
3) an aquifer that is entirely in the territory of a State but which is hydrologically linked to a transboundary river;
4) an aquifer entirely within the territory of one State but is hydrologically linked to an aquifer in a neighboring State; and
5) an aquifer entirely within the territory of one State but whose area of recharge is in a foreign state.

Other than Case 1, these different cases address possible sharing of an aquifer between States. The varying rights, duties and obligations of States sharing transboundary aquifers is influenced by the very specific hydrological and other features of a particular transboundary aquifer as much as the political relationship between the two countries sharing the aquifer. One main feature to be considered is the renewability of the aquifer: rules for the sustainable management of a renewable aquifer should be different from a non-renewable resource.

D. Existing Groundwater Legislation in India and Pakistan

In this section, the groundwater laws of India and Pakistan will be identified, summarized and ordered for each country, first with reference to constitutional provisions and then by laws at the Union/Federal, State/Province and local-government levels.
1. Groundwater Law in the Indian States adjoining Pakistan

1) Constitutional Provisions

The Union of India is a Republic of States. The Constitution of India distinguishes between the subjects that may be legislated upon by the Union and which may be legislated upon by the States. The Constitution mandates the Union with responsibility to legislate over subjects mentioned in List I (Union List) and mandates each State to legislate over subjects mentioned in List II (State List). A List III (Concurrent List) sets out subjects over which both the Union and the States may legislate. Under the Indian Constitution, if a subject is not listed in Lists I to III, it is called a residual subject which may only be legislated upon by the Union.

Water, generally, finds mention in the Indian Constitution in these Lists as under:

i. List I (Union List), Entry No. 56: “Regulation and development of inter-state rivers and river valleys to the extent to which such regulation and development under the control of the Union, is declared by Parliament by law to be expedient in the public interest”.

ii. List II (State List), Entry No. 17: “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the projections of Entry 56 of List I”.

Thus, a broad distinction can be drawn between the legislative jurisdiction of the Union and States with respect to water. The Union retains jurisdiction over inter-State rivers and river valleys if it is expedient and in the public interest to do so and the States have jurisdiction over other types of water resources, subject to the Constitution.

List III does not carry any entry for groundwater or water. However, water is an important component and part of the environment in general. The subject of Environment is not found in Lists I to III, making it a residual subject under the legislative competence of the Union. The Indian Parliament, in exercise of its mandate over residual subjects, has legislated on the environment and passed the Environment (Protection) Act, 1986 (discussed below).

Groundwater, being an important part of the environment, has thus been regulated by the Union in exercise of powers conferred by the Environment (Protection) Act, 1986 through the establishment of the Central Groundwater Authority.

While groundwater is not specifically mentioned in the Indian Constitution, it is in practice understood to be part of the category of “water supplies” or “irrigation” mentioned in the State List. Despite it not being mentioned specifically in the Indian Constitution, “the view that groundwater is a state subject is almost universally subscribed to by most of the administrators at all levels, centre, state and local.” The Union’s regulation of groundwater through the Environment Protection Act, 1986 is an exception to this universal subscription.

The 73rd and 74th Amendments to the Indian Constitution (discussed in paragraph 1D(1)(4) below) were passed in 1992 and were in regards Panchayats and Municipalities. These amendments have been appreciated as a step towards establishing robust local government and envisage the devolution from the State to the local-level of certain functional responsibilities in respect of several aspects of groundwater.

2) Union Legislation

i. Indian Easements Act, 1882

“Easements” are not immediately associated with groundwater. This type of a legal right originated as part of the English Common Law of real property and was introduced to
South Asia during the Colonial Period. Given the archaic origins of the English law of real property, it is unsurprising that aspects of groundwater are found within it.

An easement is a right in immovable property and is defined as “a right which the owner or occupier of certain land possesses, as such, for the beneficial enjoyment of that land, to do and continue to do something, or to prevent and continue to prevent something being done, in or upon, or in respect of certain other land not his own.” It is peculiar right in as much as it vests the owner of land with rights over another’s land in certain circumstances. For example, nothing in the Easements Act, 1882 derogates from “Any right of the Government to regulate the collection, retention and distribution of the water of rivers and streams flowing in natural channels, and of natural lakes and ponds, or of the water flowing, collected, contained or distributed in or by any channel or any work constructed at the public expense for irrigation.” Easements, therefore, in as much as they operate or exist over water, do not operate or exist over water that flows naturally, or is found in nature or is part of the public irrigation network.

Groundwater is mentioned in Section 7 of the Act, which explains “Easements are restrictions of one or other of the following rights”, and proceeds to give illustrations including, inter alia, “The right of every owner of land to collect and dispose within his own limits of all water under the land which does not pass in a defined channel and all water on its surface which does not pass in a defined channel” (Emphasis added). It is pointed out that the rules regarding groundwater stated in the Act are largely derived from and a codification of English case law till that date. Broadly speaking, the law recognizes the easement a property owner has over groundwater connected to his/ her land, subject to conditions. Ownership of groundwater accrues to the owner of the land above it provided the groundwater is not part of a “defined channel”. Where groundwater was found to flow in defined channels, the rules applicable to surface water, as found in the Act, apply. This position reflects the view of the English Courts and case law of the nineteenth Century. Modern science has revealed much of groundwater as a dynamic resource that flows through defined channels. As such, it would appear the scope of the easement over groundwater is limited. It is surprising that, despite immense leaps in scientific understanding of the nature of aquifers, the legal position regarding groundwater law in South Asia has not been updated from the law of the Victorian period. Culley’s observation gives this surprise, highlights another important dimension and raises serious doubt over the competence of these groundwater rules.

The fact that existing rules directly derive from English case law is not surprising since the rules were developed in the nineteenth century. What is more surprising is that the rules were never adapted to the vastly different climatic conditions prevailing in India, whose climate includes arid and semi-arid tropical areas, tropical and subtropical rainy areas with only a small part of the country having climate conditions comparable to England. Further, these rules were never adapted to the completely different patterns of water use, for instance with regard to irrigation accounting for the overwhelming share of water use.

In addition, by affixing ownership of groundwater by individuals only to property owners, the Act does not recognize the drinking water rights of other inhabitants of that property. This is particularly alarming in a region where property ownership is not equitably distributed and thus the vast
majority can claim no legal right to groundwater.

ii. Water (Prevention and Control of Pollution) Act, 1974

The Act provides for “the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, for the establishment, with a view of carrying out the purposes aforesaid, of Boards for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions related thereto”. By 1990, all States had adopted the Act and State Pollution Control Boards which, in conjunction with the Central Pollution Control Board established under the Act, inter alia, lay down “effluent standards for the sewage and trade effluents and for the quality of receiving waters (not being water in an inter-state stream) resulting from the discharge of effluents”. The Act also contains specific provisions for prohibiting the use of streams or wells for disposal of polluting matter, emergency measures in case of pollution of streams or wells and the powers of the Boards to make applications to court for restraining apprehended pollution of water in streams and well. The Act defines a “stream” as including, inter alia, subterranean waters and thus the Boards exercise an environmental regulatory function over groundwater pollution control.

iii. Environment (Protection) Act, 1986

The Act provides “for the protection and improvement of environment and for matters connected therewith” and defines the environment as including water. The Act allows the Central Government to make rules to provide for, inter alia, the standards of air, water or soil for various areas and purposes. In exercise of powers conferred under the Act, the Central Government has constituted a Central Groundwater Authority.

The Authority was established by the Ministry of Environment and Forests, Government of India in 1997 in pursuance of an Order of the Supreme Court of India passed in the public interest litigation matter and “for the purposes of regulation and control of Groundwater Management and Development”. The Authority functions under the administrative control of the Ministry of Water Resources. The jurisdiction of the Authority is within areas notified by the Ministry for regulation within States throughout the whole of India and it exercises powers, inter alia: to regulate indiscriminate boring and withdrawal of groundwater in the country and to issue necessary regulatory directions for this purpose.

Membership of the Authority includes ex officio representation of members of the Central Groundwater Board, which is an apex body at the national level responsible for the investigation, exploration, assessment and rendering of technical advice for the development and management of groundwater resources. With technical expertise from the Board and powers conferred by exercise of law, the Authority can regulate the quality of groundwater as well as the quantity of groundwater withdrawn throughout India. The Authority has published guidelines and criterion for evaluating proposals and requests for groundwater abstraction and saline groundwater extraction in areas notified for groundwater regulation.

3) State Legislation

i. Jammu and Kashmir

There is no state legislation regarding groundwater and no areas notified for regulation by the Central Groundwater Authority.

ii. Himachal Pradesh

The Central Groundwater Authority has no notified areas within Himachal Pradesh. Here, the Himachal Pradesh Groundwater (Regulation and Control of Development and
Management) Act, 2005 provides for the regulation and control of the development and management of groundwater. The Act permits the State Government to establish, by notification, the Himachal Pradesh Groundwater Authority, which is to operate under the overall control of the State Government. The Authority, if necessary or expedient in the public interest, may advise the State Government to control or regulate the extraction of groundwater in any form in any area. Persons interested in digging a well for any purposes may do so only after granting of a permit by the Authority. In granting or refusing a permit, the Act requires the Authority to have regard to, inter alia, the purpose for which the water is to be used, the existence of other competitive users and the availability and quality of water. The Act further provides for the registration of any existing users of groundwater with the Authority and allows the State Government to set the rate of royalty for extraction of groundwater. The Authority may enforce its decisions by exercise of powers conferred under the Act or may prosecute contraventions of the Act before a Magistrate.

The Himachal Pradesh (Regulation and Control of Development and Management) Rules, 2006, inter alia, set out the manner in which applications for the grant of a permit to extract groundwater or to register existing users of groundwater may be made to the Authority.

iii. Punjab

At present, the Central Groundwater Authority has areas notified for regulation in three Districts of the State. The Preservation of Subsoil Water Act, 2009 provides for the prohibition of sowing nursery paddy and transplanting paddy before mid-June, one of the main reasons for the fall in groundwater levels in Punjab. The Act prohibits the sowing or transplantation of paddy before the 10th day of May of an agricultural year or such other date as may be notified by the State Government.

The Act helps to effect water savings in annual groundwater draft through the mandatory shifting of the transplanting dates of paddy to avoid the high evaporation rates in early summer. Estimates show that the Act has the potential to achieve annual savings of millions of cubic meters of water and millions of kWh of energy used for pumping groundwater.

iv. Haryana

The Central Groundwater Authority has notified areas for regulation in seven Districts of the State. The Haryana Preservation of Subsoil Water Act, 2009 provides for the prohibition of sowing of nursery paddy and transplanting of paddy before mid-June, for the same reasons and in the same manner as the Punjab Preservation of Subsoil Water Act, 2009.

v. Rajasthan

The Central Groundwater Authority has notified areas for regulation in seven Districts of the State. There is no state legislation over groundwater.

vi. Comment on State Level Legislation

Although water is recognized as a State subject, there appears little State-level legislation over groundwater in any state other than Himachal Pradesh. Instead, States appear to prefer the regulation of groundwater through the Central Groundwater Authority. This is not to suggest that States do not consider groundwater important. Himachal Pradesh has directly legislated the regulation of groundwater while Punjab and Haryana, recognizing the need to control groundwater extraction but not willing to pay the political costs of doing so, have opted for indirect regulation through control of the planting time of the
paddy crops. Union-level regulation is limited to those areas notified for regulation by the Central Groundwater Authority.

4) Local Level Legislation

i. Rural Areas

The Seventy-third Amendment to the Indian Constitution established a constitutionally recognized and mandated system of local self-government through a system of Panchayats at the village (Halqa or Gram Panchayat), intermediate (Block Panchayat or Panchayati Samiti) and district (Zila Panchayat) levels. These Panchayats are to be entrusted by State legislatures with powers necessary for them to function as institutions of self-government and are responsible for the implementation of schemes for economic and social justice including, inter alia, minor irrigation, water management and watershed development.

Himachal Pradesh, Punjab, Haryana and Rajasthan all have local government legislation through Panchayati Raj Acts of 1994 that are, broadly, similar in nature in the distribution of powers and functions of local governments over water resources. In summary, it is the responsibility of the Halqa or Gram Panchayats to manage and maintain water resources such as wells, tanks and ponds and to protect them from pollution. They also have powers over, inter alia, minor water bodies but not over canals as defined in irrigation legislation. Jammu and Kashmir has a local government legislation that confers broadly similar powers vide the Jammu and Kashmir Panchayat Raj Act, 1989.

ii. Urban and Transitional Areas

The Seventy-fourth Amendment to the Indian Constitution sought to strengthen local self-government in cities in towns and envisaged a system of Municipal Corporations for large cities, Municipal Councils for small cities and town and Nagar Panchayats for areas in transition from rural area to urban area.

The Seventy-fourth Amendment requires the constitution of planning committee in every District and Metropolitan area of every State to consolidate the plans prepared by the Panchayats and Metropolitan Corporations/Municipalities and to prepare a draft development plans. In preparing such draft development plans, regard is to be had to matters of common interest between the Panchayat and Metropolitan Corporations/Municipalities, including sharing of water and other physical and natural resources, the integrated development of infrastructure and environmental conservation.

Municipalities have the power, authority and responsibility to perform and implement schemes, including those in relation to, inter alia, water supply for domestic, industrial and commercial purposes.

5) Comment on Local Level Legislation

It is difficult to improve on Cullet’s remark: “At a generic level, there is thus a clear structure for local regulation of groundwater. At the same time, regulation has never gone beyond generic statements, and local bodies of governance have not yet been given effective regulatory control over groundwater at the local level, whether at the gram panchayat, block panchayat or district panchayat level. The result is that there is a formal framework providing a basis for regulation based on the subsidiarity principle but the reality is that decentralization largely stops at the state level. This is insufficient in a context where some Indian states are bigger than medium-sized countries.”
2. Groundwater law in Pakistani Provinces adjoining India

1) Constitutional Provisions

The Constitution of the Islamic Republic of Pakistan, 1973 gives National Assembly the power to legislate on subjects enumerated in the Federal Legislative List and gives Provincial assemblies power to make laws in respect of any matter not so enumerated. Water is not mentioned in the Federal Legislative List, making it a subject of provincial legislative competence.

Water is, however, mentioned in the text of the Pakistani Constitution itself, in its provisions regarding the Council of Common Interests. The Constitution mandates the Council of Common Interests, an apex body comprising of the Prime Minister as Chairman, the provincial Chief Ministers and three members from the Federal Government, to formulate and regulate policies in relation to matters in Part II of the Federal Legislative List. Item 3 of Part II of the Federal Legislative List includes the Pakistan Water and Power Development Authority, established under the Water and Power Development Authority Act, 1958 (discussed below). The Water and Power Development Authority has control over, inter alia, the under groundwater resources in any region in a Province. In this manner, through water is a provincial subject, the Council of Common Interests may develop a groundwater policy through the Water and Power Development Authority.

In addition, Article 155 of the Pakistani Constitution gives the Council of Common Interests the power and authority to hear complaints as to interference with water supplies in the following terms:

Complaints as to interference with Water Supplies. (1) If the interests of a Province, the Federal Capital or the Federally Administered Tribal Areas, or any of the inhabitants thereof, in water from any natural source of supply or reservoir have been or are likely to be affected prejudicially by-

(a) any executive act or legislation taken or passed or proposed to be taken or passed; or
(b) the failure of any authority to exercise any of its powers with respect to the use and distribution or control over water from that source, the Federal Government or the Provincial Government concerned may make a complaint in writing to the Council.

(2) Upon receiving such a complaint, the Council shall, after having considered the matter, either give its decision or request the President to appoint a commission consisting of such persons having special knowledge and experience in irrigation, engineering, administration, finance or law as he may think fit, hereinafter referred to as the Commission.

(4) After considering the report and supplementary report, if any, of the Commission, the Council shall record its decisions on all matters referred to the Commission.

It can be observed that the Pakistani Constitution provides for a forum to adjudicate complaints concerning interference in water supplies, including presumably groundwater. However, this Constitutional platform is not automatically available; only the Federal Government or Provincial governments may refer a matter to the Council of Common Interests, and that too if the conditions stipulated in Article 155(1) (a) and (b) are met. Moreover, inter-provincial politics, difficulties in convening or setting the agenda of the Council of Common Interests make it an unreliable platform for adjudication of such complaints. However, the Constitution ensures that, if an adjudication does take place, it will be based on experience and not politics.

2) Federal Legislation

i. Water and Power Development Authority
Act, 1958

The Act provides for “the unified and coordinated development of the water and power resources of Pakistan”. The Act establishes the Water and Power Development Authority and gives it the general power and duty to prepare comprehensive plans for the development and utilization of water and power resources including the power, inter alia, to frame schemes providing for irrigation, water supply and drainage; and the recreational use of water. The Act also confers onto the Authority the control over, inter alia, under Groundwater resources of any region in Pakistan subject to provincial agreement and notification. Given the jurisdiction of the Council of Common interests to set policy in relation to the Authority, groundwater is, therefore, subject to the policies of the Council, but any scheme framed on such policy would require the permission of the provincial government concerned. In this manner, the Pakistani Constitution provides a balance of Federal coordination and provincial consent in the framing of any groundwater schemes by the Authority.

The Water and Power Development Authority has a proud history of developing water infrastructure in Pakistan and is an immense resource of hydrological information in Pakistan.

ii. Easements Act, 1882

The Act is identical to the Indian Easements Act, 1882. The codification of groundwater law is the same as the Indian Easements Act, 1882 while the opportunity to update the law on the subject has arisen less frequently. Comments on the Indian Easements Act, 1882 are mutatis mutandis, applicable hereto.

3) Provincial Legislation

i. Punjab

a. Irrigation and Drainage Act, 1873

The Act provides for the regulation of irrigation, navigation and drainage. The preamble of the Act states, “the Provincial Government is entitled to use and control for public purposes the water of all rivers and streams flowing in natural channels, and of all lakes, sub-soil water and other natural collections of still water...” To this end, the Act gives the provincial government the power to notify, inter alia, that any sub-soil water should be applied or used by the provincial government for the purpose of any existing or projected canal or drainage work.

Through an amendment in the Act passed in 2006, the Provincial Government was made responsible for management of sub-soil water. The newly inserted Section 62-A requires the Provincial Government to take steps to manage properly sub-soil water and to protect the aquifer, the quality and quantity of such water. To do so, the Provincial Government is to draw up schemes for the proper management of sub-soil water and publish it.

The Act thus gives the Provincial Government and its Irrigation Department two distinct controls over groundwater. The first by way of notifying any groundwater to be used for a proposed or existing canal or drainage work; and the second by way of general control to properly manage groundwater and draw up management schemes in relation to it.

The Act thus envisages overall responsibility to take action to ensure the proper management of sub-soil water in Punjab and to protect its quality and quantity vests with the Government of Punjab.

b. Punjab Soil Reclamation Act, 1952

The Act seeks to provide for the speedy reclamation and improvement of the areas...
damaged by thur (salinity) and sem (waterlogging) for preventing further damage and for maximizing agricultural production. The Act establishes a Punjab Land and Water Development Board responsible for, inter alia, the preparation of schemes for the reclamation of local areas or the prevention of thur and sem and the Act prescribes a procedure for the acquisition, compensation, and development of such land. As soon as a scheme for a local area is sanctioned by the Water Development Board, “the use of under groundwater in that area except the water used for domestic purposes or for watering livestock shall come under the control of the Board.”

Under the Government of Punjab Rules of Business, 2011, the responsibility for the administration of the Act vests with the Irrigation Department.

c. Punjab Irrigation and Drainage Authority Act, 1997
The Act provides for the establishment of the Punjab Irrigation and Drainage Authority “to implement the strategy of the Government of Punjab for streamlining the Irrigation and Drainage System; to replace the existing administrative setup and procedures with more responsive, efficient and transparent arrangements; to achieve economical and effective operation and maintenance of the irrigation, drainage and flood control system in the Province; to make the irrigation and drainage network sustainable on a long-term basis and introduce participation of beneficiaries in the operation and management thereof.”

The powers and duties of the Authority are, inter alia, to “coordinate and regulate the measures being undertaken or required to be undertaken in the Province for recording and gauging surface waters, monitoring of groundwater table and quality of water and the compilation of data relevant thereto and in this regard to establish and regularly maintain proper liaison with similar work being undertaken in other Provinces.” The Authority is thus responsible for monitoring groundwater quality and quantity in Punjab.

Section 8 of the Act gives Punjab Irrigation and Drainage Authority control over Provincial water resources (rivers, canals, drains, streams, hill torrents, public springs, natural lakes, reservoirs (except such reservoirs as are under the control of WAPDA) and under groundwater resources within the Province subject to the Indus Waters Treaty and the Water Apportionment Accord of 1991.

The control of the Punjab irrigation and Drainage Authority over groundwater resources in Punjab remains limited “to affect schemes” prepared under the Act in relation to public purposes and are not an over-arching control over groundwater in the Province. Nevertheless, this power is similar to and overlaps with the power of the Government of Punjab to control sub-soil water under Section 62-A of the Irrigation and Drainage Act, 1873. However, since both the oversight of the Authority and the exercise of power under the Irrigation and Drainage Act, 1873 rest with the Irrigation Department, there appears to be a means of coordinating the exercise of this overlapping control.

ii. Sindh
a. Sindh Irrigation Act, 1879
The Act provides for irrigation in the Province of Sindh. The preamble of the Act states, it is necessary “to make provision for the construction, maintenance, and regulation of canals, for the supply of water therefrom and the levy of rates of water so supplied.” The Act allows the provincial government to notify, inter alia, that any sub-soil water should be applied or used by the provincial government for the purpose of any existing or projected
canal. If groundwater is notified for any such use, the Act considers such water to be included in the definition of “canal.”

iii. Comment on Provincial laws

Provincial laws clearly envisage the control of groundwater with the respective Irrigation Department but such control is not absolute. It is limited, in both Sindh and Punjab, over sub-soil water necessary for any existing or proposed canal. However, in the Punjab, the provincial government has the responsibility to manage sub-soil water to prevent pollution and over-exploitation. Due to the problem of salinity, the Punjab Assembly also gave the Government the power to take action to control and reclaim land.

4) Local Level Legislation

Local governments have been strengthened by the 18th Amendment to the Constitution, passed in 2010, which stipulates, “Every Province shall, by law, establish a local government system and devolve political, administrative and financial responsibility and authority to the elected representatives of the local governments.” Before the 18th Amendment, the Constitution envisaged only two tiers of government: the Federal and the provincial. The devolution of “administrative and financial responsibility and authority” to this third tier, however, is an ongoing process.

I. Punjab

a. Local Government Legislation

Local government legislation in force at present is the Punjab Local Government Ordinance, 2001. The Ordinance provides for the reconstruction and regulation of local governments and establishes local governments at the District, Tehsil and Union Council levels.

At the District level, one of the functions of a Zila (District) Council is, inter alia, to review the development of “integrated system of water reservoirs....” The Ordinance defines “water reservoir” as including a spring, well, tube well, pond, tank, water course, culvert, and any channel for supplying water other than canal, river, lake or stream.

At the Tehsil level, one of the functions of the Tehsil Municipal Administration is, inter alia, to provide, manage, maintain and improve municipal infrastructure including the water supply and control and development of water resources....” In large urban areas (City Districts), Town Municipal Administrations carry out the same function except where an integrated system is maintained by a third entity for and on behalf of the City District. Water and Sanitation Agencies established under the Punjab Development of Cities Act, 1976 and Lahore Development Authority Act, 1975 carry out water supply and sanitation services in City Districts.

At the Union Council level, one of the functions of the Union Administration is to “provide and maintain public sources of drinking water, including wells, water pumps, tanks, ponds and other works for the supply of water.”

The Ordinance allows the Government and local governments, within the ambit of their responsibilities, to make rules and bye-laws. Specifically, rules and bye-laws may be made for, inter alia, prevention of water pollution. In addition, “notwithstanding any specific provision in the Ordinance, every local government ... shall perform their functions conferred by or under this Ordinance and in performance of their respective functions shall exercise such powers and follow such procedures as are enumerated in the Sixth Schedule.”
The Sixth Schedule of the Ordinance, inter alia, provides that “concerned local governments may prepare and implement schemes for the prevention of the pollution of water or land from such sources and in such manner as the bye-laws may provide.” With respect to water supply, the Sixth Schedule provides, inter alia, that the concerned local government shall control all private sources of water supply within its local areas, and that no new well, water pump or any other source for drinking purposes shall be dug except without its permission.

b. Development Authorities in Urban Areas

Urban planning and development in Punjab is regulated in Lahore Division by the Lahore Development Authority Act, 1975 and in selected urban areas of Punjab by the Punjab Development of Cities Act, 1976.

The Lahore Development Authority Act establishes the Lahore Development Authority. The Development of Cities Act, 1975 allows the Government of Punjab to establish Development Authorities in such cities as it may determine from time to time. Both Acts confer onto the Lahore Development Authority and Development Authorities the “exclusive right to use the groundwater resources of the areas under their control.” The Punjab Development of Cities Act, 1976 further prohibits the installation of a tube well for commercial purposes without the permission of the Development Authority. The Lahore Development Authority Act, 1975 outright prohibits the installation of any tube well within its controlled area. Both Acts permit the Lahore Development Authority and Development Authorities to levy a rate on any person who has installed or intends to install a tube well.

ii. Sindh

The local government legislation in force at present is the Sindh Local Government Ordinance, 1979. The Preamble of the Ordinance says, it is to “consolidate and amend the law relating to local government and to provide for the constitution of councils in the Province of Sindh.” The Ordinance thus establishes local governments at the District, and Union Council levels and provides for Corporations, Municipal Committees and Town Committees in urban areas.

The compulsory functions to be performed by Corporations, Municipal Committees and Town Committees include, inter alia, exercising control over private sources of water supply. Private water supplies within the local area concerned shall be subject to the control, regulation and inspection of the Corporation, Municipal Committee or Town Committee concerned. Optional functions include, inter alia, sanctioning the digging, construction or provision of any well, water-pump or any other source of water.

At the District level, one of the compulsory functions of District Councils is “Provision of water supply, construction, repair and maintenance of water works and other sources of water supply.” One of the optional functions is “Preservation and reclamation of soil and the drainage and reclamation of swamps.”

At the Union Council level, functions of the Union Councils include, inter alia, “To act as the construction agency for ... piped water supply [and] hand pumps...” and the “Provision and maintenance of wells, water pumps, tanks, ponds and other works for the supply of water.”

5) Comment on Local Level Legislation

The treatment of groundwater by local government legislation in Sindh and Punjab is slightly different and so will be considered separately. However, in both Provinces, there is a framework for regulation based on the subsidiarity principle. As noted earlier, the
process of decentralisation is ongoing. The devolution of administrative control to local governments will shape the manner in which groundwater law is understood.

In Punjab, local governments have wide powers to maintain natural sources of water as well as over infrastructure for drinking water purposes. The laws also confer on local governments, the Lahore Development Authority and Development Authorities, wide powers to regulate the use of private water sources and tubewells for drinking water. These wide powers over private water sources impinge on the individual rights to groundwater recognized by the Easements Act, 1882 and the control over groundwater management otherwise vested in the Provincial Government. No framework of coordination between local governments, the Lahore Development Authority and Development Authorities on the one hand and the Irrigation Department on the other exists over groundwater.

In Sindh, the control of groundwater sources for drinking purposes as well as for preservation and reclamation of soil is vested in local governments. In urban areas, local governments maintain control over private sources of water supply. As in Punjab, this control over private sources of water creates an overlap with the jurisdiction of the Irrigation Department responsible for the aquifer on the one hand and local governments responsible for providing drinking water on the other.

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 equitable access to adequate quality of drinking water. It is important to note that in the Indian jurisdiction, the concept of “public trust” 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 dealing specifically with water being extracted from the aquifer for commercial purposes and so addresses groundwater specifically. Regardless, the concept of public trust in both jurisdictions posits that natural resources like air, sea, waters and forests are public trusts; and enjoins onto the Government the fiduciary duty to protect such resources from misuse and over-exploitation. The doctrine also binds the Government to ensure that such resources are enjoyed by the public and disallows their transfer for private ownership and use. The trustee cannot alienate the trust nor can it fundamentally change its nature.

The Government, as trustee of the natural resource of groundwater, is thus under a responsibility to the general public to ensure that the distribution of water from the aquifer neither deprives any individual or group from access to domestic water nor significantly affects ecosystem needs. Given the control and regulation of groundwater in India and Pakistan operates on the Federal/Union, Province/State and local level, it is imperative that the trustee exists at multiple levels and that the role of local government be properly appreciated within this scheme of management.

3. **Indian and Pakistani Case Law on Groundwater**

The Superior Judicialities of India and Pakistan have both 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.

4. **Evaluation of existing legislation**

A study of the Indian and Pakistan groundwater laws reveals points of
convergence and divergence on rights, control and management. While the Constitutions of both the countries respect the legislative competence of the states/Provinces with regard to groundwater, in practice, both India and Pakistan have mechanisms that allow the control over groundwater to the Union/Federal Government.

In India, the Central Groundwater Board can exercise great control over groundwater in areas notified for regulation. In Pakistan, the Council of Common Interests sets policies upon which the Water and Power Development Authority can develop and implement schemes in relation to groundwater.

At the state/Province level, Indian and Pakistani legislation diverges. Though both India and Pakistan inherited a system of canal irrigation and management from the Colonial Period, the irrigation laws applicable in each Province/State have different approaches to groundwater. In India, state irrigation legislation does not cover groundwater. In Pakistan, both in Punjab and Sindh, the provincial governments may apply any sub-soil water for use in an existing or proposed canal within the irrigation network.

In Pakistani Punjab, the Irrigation Act, 1873 gives entitlement over sub-soil water to the Provincial Government and a 2006 amendment gives the responsibility of the management of the aquifer to the Provincial Government. The Government of Punjab is to evaluate the condition of the aquifers and may draw up schemes for their proper management. The Punjab Soil Reclamation Act, 1952 gives the Government of Punjab the power to undertake schemes for reclamation of saline and waterlogged lands. Since salinity is a major issue in irrigation, this is a wide power. Furthermore, the Punjab Irrigation and Drainage Authority Act, 1997 gives the Government of Punjab the control over groundwater resources for the purposes of schemes prepared for a public purpose under the Act. Thus groundwater legislation in the Punjab, far more markedly than in Sindh, gives the Government of Punjab entitlement to the use and control and management of the aquifer and groundwater.

In India, state level legislation over groundwater was limited and varying in the states under study. In Jammu and Kashmir and Rajasthan, there was no state-level legislation on groundwater. Punjab and Haryana have taken the indirect measure of preserving groundwater through a restriction on the paddy plantation season and not by an assertion of right to control. Only in Andhra Pradesh, specific groundwater legislation exists that gives the State Government the power to regulate the extraction of groundwater.

Both in India and Pakistan, the Constitutions and laws do envisage a large role for local governments in the protection and preservation of water resources including, presumable, aquifers and groundwater, as well as the construction, operation and maintenance of drinking water infrastructure. Both Constitutions envisage local-level decision making in relation to groundwater, which is the most local of resources. However, in practice, local governments in India and Pakistan seldom have had the financial, technical or operational capacity to fulfill their responsibilities.

At the local level, in the case of Pakistan, local governments have assumed a far greater role in groundwater management than those 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. Local governments in India are not conferred such a control in such specific terms.
The comparable lack of state control over groundwater in India and the enhanced control over private sources of water by local governments in Pakistan reveals perhaps the starkest difference in the approach to groundwater law in both jurisdictions: the personal right to groundwater. In India, such a right clearly rests in the owner of the property over which an aquifer lies. In Pakistan, provincial and local government authorities’ legislative control over water is in conflict with this personal right to groundwater. The Superior Judiciary of Pakistan has not yet resolved this conflict.

E. Developments in International Transboundary Groundwater Law

Before entering into an elaboration of recent developments in international transboundary groundwater law, it would be appropriate to provide insight into the only transboundary water agreement between India and Pakistan.

1. The Indus Waters Treaty, 1960

It is submitted that both Pakistan and India are not signatories to any legal instruments that regulate their conduct over groundwater with respect to each other. The Indus Waters Treaty, concluded between India and Pakistan in conjunction with the good offices of the World Bank in 1960, regulates India’s right to use the waters of the Eastern Rivers of the Indus Basin, but it pertains to surface water and the limited rights of India to develop hydropower resources on those Western Rivers. Even if the Indus Waters Treaty, 1960 could be considered as regulating groundwater rights, it is submitted that such regulation, if at all, would only apply to aquifers connected to transboundary rivers. Nevertheless, it is instructive to provide a summary of major international legal instruments that shape our understanding of international law on transboundary aquifers.

The Indus Waters Treaty is a by-product of the Partition of India. The new political boundary between the new States of India and Pakistan was divided, in the Punjab in the East and Bengal in the West, along communal lines. In the Punjab, the new political boundary cut across the largest contiguous irrigation system in the world. The thinking behind the partitioning did not appear to include the impacts it would have on the sharing of water resources.

The Treaty was finally concluded after protracted negotiations that lasted over a decade. One of the unique characteristics of the Treaty is that rather than dividing the waters of the Indus rivers system, it divided the six rivers comprising the Indus rivers system between the two parties in the following manner.

Under Article ii(1) of the Treaty, “All the waters of the Eastern Rivers shall be available for the unrestricted use of India except as expressly provided . . . .” Article iv of the Treaty allows Pakistan to “receive for unrestricted use all those waters of the Western Rivers which India is under obligation to let flow under the provisions of Paragraph (2)” Paragraph (2) thereof stipulates India shall let flow all the waters of the Western Rivers and shall not interfere with these
except for, inter alia, domestic use, non-consumptive use, agricultural use and limited hydro-electric power.

The Treaty defines the Eastern Rivers as the Sutlej, Beas and Ravi and the Western Rivers as the Indus, Jhelum, and Chenab. Eastern and Western Rivers include connecting lakes, if any, and all their Tributaries. Tributaries of a river, in turn, are defined as “any surface channel... whose waters in the natural course would fall into that river” (emphasis added).

By limiting itself to the “waters” of the “rivers” of the Indus Basin and their tributaries, the Treaty clearly does not envisage the regulation of groundwater. This contention is reinforced by the following observations.

To oversee the accord between the two countries, the Treaty established institutional arrangements, namely the Permanent Indus Commission comprising a Commissioner from each country. Amongst the responsibilities of the Permanent Indus Commission is the exchange of data. Article VI of the Treaty provides that information on daily flow, withdrawal, escapades and delivery from link canals shall regularly be exchanged between the parties. Again, by restricting the exchange of data to surface water of the rivers, the Treaty indicates it does not envisage groundwater.

Article VII of the Treaty provides for future cooperation and states that both Parties “recognize they have a common interest in the optimum development of the Rivers...” and agree to cooperate to the fullest possible extent, but in particular the establishment of hydrologic and meteorological observation stations and drainage and engineering works”. Again, the Treaty restricts itself to the waters of Rivers and not to groundwater.

There are, however, arguments that the Treaty may be revised or upgraded to include issues that have arisen in relation to the proper implementation of the Treaty but which were not considered by it. Such arguments can be extended to include provisions on groundwater. The Indus Basin Working Group report on the Indus Basin encapsulates these arguments as follows:

Since 1906, the IWT has stood through the 1965, 1971 and 1999 wars between the two countries and survived numerous lesser clashes. Marked dissatisfaction with the IWT exists in both India and Pakistan. A significant body of opinion in India regards persistent Pakistani objection to planned Indian infrastructure projects on the Western Rivers as unfairly stalling India’s legitimate development programs. Many in Pakistan, in turn, fear that individual Indian proposals generate substantial cumulative impacts downstream. In the wake of continuing controversies, voices in both countries suggested revising the IWT terms – or even scrapping the accord and starting over. Ultimately, some future mutually agreed alternation to the IWT might improve the scope for effective international cooperation and integrated resource management across the basin. Presently, however, moves to renegotiate the IWN would almost certainly be more contentious than current confidence levels between the parties could bear.

At present, nothing short of a revisiting of the Treaty, to include provisions with respect to groundwater, would lead to better transboundary aquifer management. The existing provisions of the Treaty restrict its scope to surface water alone.

2. The Helsinki Rules on the Uses of the Waters of International Rivers, 1966
The Rules were adopted by the International Law Association in Helsinki in 1966 were a codification of International Law on
international drainage basins till that time. Despite their adoption, there is no mechanism to enforce these rules. The Rules are applicable to all basin states of international drainage basins except where other agreements exist. The Rules define international drainage basin as under:

An international drainage basin is a geographical area extended over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

The Rules thus apply to a system of waters, including surface and underground waters, that flow into a common terminus. As groundwater is now known to be a dynamic resource, and as it is also known that only some aquifers flow to common termini, the Rules are applicable only to those transboundary aquifers that flow to a common terminus.

The Rules assert the right of bordering nations to a “reasonable and equitable share” in the beneficial uses of the water of their shared international drainage basin and provide eleven criterion to determine the same. The principle of “reasonable and equitable share” is the cardinal rule of international water Law and although the Rules are not binding, they are “widely accepted as representing customary international law”. The Rules are a departure from the Harmon Doctrine, which has been cited as supporting the proposition that a State has the absolute right to utilize and dispose of the waters of an international river flowing through its territory; and that a State has no right to demand the continued flow of water from co-basin states.

The Rules restrict any detrimental change to the composition, content, or quality of the waters of an international drainage basin.

The Rules have led to the creation of the United Nations Convention on the Law of Non-Navigational Uses of International Watercourses (discussed below) and were superseded by the Seoul Rules on International Groundwater, 1986 (discussed below) and the Berlin Rules on Water Resources (discussed below) in 2004.


The Dublin Principles emerged from the International Conference on Water and the Environment in Dublin in 1992. The Conference recognized the increasing scarcity of water and developed the Principles that are a set of non-binding declarations for action at the local, national and international level to reduce the scarcity as under:

Principle 1: Fresh water is a finite and vulnerable resource, essential to sustain life, development, and the environment.

Principle 2: Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

Principle 3: Women play a central part in the provision, management and safeguarding of water.

Principle 4: Water has an economic value in all its competing uses and should be recognized as an economic good.

The Principles provide a possible framework of understanding for any interaction on transboundary aquifers and have led to the formation of the Global Water Partnership and the Global Water Partnership Framework for Action. Of special note is the importance that the Principles give to participatory development and management and of the role of women in providing, managing and
safeguarding water.


These Rules were adopted by the international Law Commission in Seoul in 1986 and extend the application of the Helsinki Rules to transboundary aquifers that do not contribute water to or receive water from, surface waters of an international drainage basin. They thus apply to transboundary aquifers interconnected to the surface waters of international drainage basins. The Rules are not binding.

The Rules also deal with protection of groundwater and urge riparian states to consider integrated management of their international groundwater, including conjunctive use with surface waters.


The Rules were adopted by the International Law Association in Berlin in 2004 and are an update of the Helsinki Rules. Like the Helsinki Rules, they express “international law applicable to the management of the waters of international drainage basins and applicable to all waters.” These Rules are non-binding and applicable only to the extent that no agreement exists among basin states.

Chapter II of the Rules set out the principles of international law governing the management of all waters and prescribe conjunctive and integrated management. Chapter VIII of the Rules relate to groundwater and further broaden the application of the same:

Article 36 – Application of these Rules to aquifers

The Rules of this Chapter apply to all aquifers, including aquifers that do not contribute water to, or receive water from, surface waters or receive no significant contemporary recharge from any sources.

However, the Rules point out that, in the management of aquifers, the special characteristics of groundwater must be taken consideration of. Basin States are required to “manage groundwater conjunctively with the surface waters of any basin of which it is a part, taking into account any interconnections between aquifers or between an aquifer and a body of surface water as well as any impact on aquifers caused by activities within the State’s jurisdiction on control.” They are further under an obligation to take steps to acquire information necessary to manage groundwater and aquifers; manage aquifers sustainable, take steps to protect aquifers from pollution or degradation.

The Rules also carry specific provisions in relation to transboundary aquifers and broaden further the applicability of the Rules to various types of transboundary aquifers. The Rules state that its provisions regarding shared waters generally apply to an aquifer if:

(a) It is connected to surface waters that are part of an international drainage basin; or

(b) It is intersected by the boundaries between two or more States even without a connection to surface waters that form an international drainage basin.

In such circumstances, States sharing such aquifers shall manage the aquifers in their entirety. The Rules provide that States shall cooperate to set drawdown rates to assure the equitable utilization of the water of an aquifer and have regard to, inter alia, the obligation not to cause significant harm to other basin States. Further, the rules provide for an obligation to cooperate and to make equitable and reasonable use of the waters.

The Convention, being the only enforceable international law that relates with transboundary aquifers, entered into force on 17th of August 2014, following it thirty-fifth ratification. The Convention is not applicable to non-signatories and does not affect the right of any watercourse state arising from any prior agreement.\(^{104}\)

The Convention was negotiated on the basis of draft articles and Rules prepared and adopted by the international Law Commission. A summary of the Convention is reproduced below:  

The Convention contains 37 articles arranged in seven parts: Part I. Introduction; Part II. General principles; Part III. Planned measures; Part IV. Protection, preservation, and management; Part V. Harmful conditions and emergency situations; Part VI. Miscellaneous provisions; and Part VII. Final clauses. An annexure to the Convention sets forth procedures to be followed in the event that States have agreed to submit a dispute to arbitration.

Part I contains the definition of the expression “international watercourse,” which is obviously of central importance. Article 2 defines the term “watercourse” broadly as “a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.” It is noted that this definition includes groundwater that is hydrologically connected with surface water, which is in fact the case for much of the world’s groundwater.\(^{105}\) The expression “international watercourse” is then defined as “a watercourse, parts of which are situated in different States.”

Article 5, contained in Part II, reflects the principle that is widely regarded as the cornerstone of the Convention, and indeed the law in the field: equitable and reasonable utilization and participation. It requires that a State sharing an international watercourse with other States utilize the watercourse, in its territory, in a manner that is equitable and reasonable vis-à-vis the other States sharing it. In order to ensure that their utilization of an international watercourse is equitable and reasonable, States are to take into account all relevant factors and circumstances. An indicative list of factors and circumstances is contained in Article 6. Article 5 also sets forth, in paragraph 2, the principle of equitable participation. According to this principle, States are to “participate in the use, development and protection of an international watercourse in an equitable and reasonable manner”. Thus, affirmative conduct may be required by this principle, which is a further elaboration of the implications of equitable and reasonable utilization.

Another key provision of the Convention is article 7 (Obligation not to cause significant harm). This article requires that States “take all appropriate measures to prevent the causing of significant harm” to other States sharing an international watercourse. The emphasis on prevention is important, since it is often difficult to stop or modify an activity once it has begun, and it can be very complicated and expensive, if indeed it is possible, to remedy harm once caused. While there has been debate, both in the negotiation of the Convention and in the literature, about the relationship between the principles set forth in articles 5 and 7, the two are seen as being complementary. The two articles work in tandem in the following way: if a State believes it has sustained significant harm due to a co-riparian State’s use of an international watercourse, it will ordinarily raise the issue with the second State. In the negotiations that follow, articles 5, 6 and 7 in effect provide that the objective is to reach a solution that is
equitable and reasonable with regard to both States’ uses of the watercourse and the benefits they derive from it. The possibility that the solution may include the payment of compensation, to achieve an equitable balance of uses and benefits, is not excluded.

Part III of the Convention sets forth the principle of prior notification of planned measures and elaborates in some detail on the various aspects of that obligation. The essence of the principle is that if a project or other measures are planned in a State and those measures may have a significant adverse effect upon another State or States sharing an international watercourse, the State in which the measures are planned must provide timely notification to the other States of the plans. If the notified States believe, the planned measures would be inconsistent with the requirements of articles 5 or 7, a process of consultations and, if necessary, negotiations follows which is intended to lead to an equitable resolution of the situation.

Part IV of the Convention deals with protection, preservation and management of international watercourses. It contains provisions on protection and preservation of watercourse ecosystems, prevention, reduction and control of pollution, and consultations concerning management of an international watercourse, among others. The importance of these provisions is perhaps obvious: watercourse ecosystems and watercourses themselves must be protected, preserved, and properly managed if they are to support human and other forms of life.

7. Evaluation of existing international law
Neither India nor Pakistan have ratified the UN Watercourse Convention and, as such, its provisions are not binding upon either. In relation to the groundwater in transboundary aquifers shared by both countries, therefore, the provisions of the UN Watercourse Convention have the same kind of enforcement status as the various Rules adopted by the International Bar Association. Nevertheless, for our purposes, both the UN Watercourse Convention and the Rules provide a highly developed framework under whose general principles India and Pakistan may cooperate over the use of their shared groundwaters. Below is a summary of some of the main principles that can be derived from this framework:

1. Both countries to utilize a 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 watercourse States concerned;
   (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 States;
   (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. Both countries 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. Both countries shall regularly exchange data and information on the shared aquifer and watercourse with one another.
4. Both countries 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, both countries may arrive at mutually agreeable measures to prevent and control pollution.

5. The obligation to use manage groundwater conjunctively with surface water, taking into account interconnections.

6. Both countries 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 both countries 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 both countries.

F. Roadmap of Action

“Mutual trust and conducive relationship is pre-requisite between India and Pakistan for joint assessment and management of transboundary water especially to tap aquifer systems for mutual benefits.”

From the discussion above, it is clear India and Pakistan share transboundary aquifer resources, and these resources are over-exploited without any transboundary coordination, leading to significant access and quality issues that threaten the violation of Constitutional rights to a clean environment and availability of water. The existing international law prescribes a transboundary resource sharing mechanism for international watercourses, such as the Indus Basin, on information sharing, conjunctive, “reasonable and equitable” use of groundwater resources with an obligation not to cause significant harm; and a dispute resolution mechanism; and promoting sustainability, equity and quality issues. Based on these circumstances and conclusions, this paper proposes a roadmap of future action that attempts – perhaps presumptuously, given the uncertain political relationship between India and Pakistan – to reach the goal of equitably and sustainably manage the shared resources. Without the application of research and scholarship leading to a comprehensive understanding of the dynamics of shared groundwater resources, no sound policy can be developed. Helpfully, UNESCO has prescribed prerequisites and steps required to study the disposition, behavior, potential etc. of transboundary aquifers and are put forward as necessary prerequisites to a healthy transboundary groundwater relationship between watershed states. Briefly, these prerequisites and steps are:

I. Identification of transboundary aquifers

In contrast to surface water that is easily identifiable, groundwater aquifers are poorly known and recognized. It is hence essential to view the entire trans-boundary aquifers, including all that are hydraulically connected directly by lateral or indirectly through vertical contact or through fractures and low permeability formations. For this purpose, data sharing amongst the countries is very important. The data gaps can then be identified and filled by carrying out further scientific studies in the area.

II. Mapping of spatial distribution of transboundary aquifers including:
   - Hydraulic parameters
   - Rainfall and recharge zones
   - Confined and unconfined areas
   - Natural discharge zones
   - Present and planned groundwater development zones
- Water quality, potential risks of its deterioration; and
- Vulnerability to polluting agents

In transboundary aquifers, one or more of the above factors may be more important than the other on flip sides of the boundary.

III. Understanding the groundwater hydraulics of shared transboundary aquifers

The groundwater flow changes when an aquifer is placed under stress when water is pumped from it, leading to the following possibilities:
- Modification of the groundwater flow pattern: where abstraction on one side of the border may alter the flow through the border;
- Modification of the hydraulic head: groundwater abstraction through wells results in modifications of the hydraulic heads in the form of a concentric cone of depression. These cones of depression may extend across international borders.
- Pollution: Anthropogenic pollution can result in aquifer pollution, and the polluted groundwater may travel to the other side of the international boundary.

IV. Pre-Requisites for Sound Management

The UNECE (United Nations Economic Survey for Europe) survey of transboundary aquifers and other studies have confirmed the need for having a unified and consistent knowledge base as a prerequisite for the management of transboundary aquifers. Ideally, this should be developed within a conceptual model of the whole transboundary aquifer, providing a firm foundation that supports sound development through risk-based management. The determination that a particular rate of groundwater withdrawal or general management plan is sound depends on in-depth understanding of the groundwater system.

This understanding begins with knowledge of basic hydrological processes. Relating this to specific situations requires an understanding of the extent and nature of the aquifer and how it relates to other aquifers and hydrogeologic features, how the recharge and discharge of water take place within the aquifer, and where potential sources of contamination are located. Without such understanding, the use of a transboundary aquifer cannot be planned. This conceptual model should be augmented by a consistent programme on both sides of a boundary to monitor basic hydrologic parameters, such as precipitation, groundwater levels, streamflow, evaporation, and water use. The monitoring programme will provide the data essential to generate a quantitative perspective on the status of the groundwater system and to validate the conceptual understanding. The data must be consistent with the conceptual model. If not, the conceptual model should be revised.

Good and reliable information is crucial to facilitate co-operation among aquifer stakeholders. All stakeholders should have easy access to good, reliable data on abstractions, water quality, and aquifer water levels. Current information technology allows information to be available to an unlimited number of users easily and economically. With such an approach, it should be possible to establish mutually accepted rules, adopted by all parties, based on a holistic definition of the aquifer system and principles of equivalence of impacts of abstraction.

The institutions, under the existing legal framework, responsible for these steps should be:

1. In Pakistan

Only the Water and Power Development Authority has the power to develop and execute schemes in relation to groundwater throughout Pakistan. However, it must obtain
the permission of a Province before commencing such a scheme within its territory. Since the Council of Common Interests (CCI) is responsible for setting policy for the Water and Power Development Authority, and since the CCI comprises of the Prime Minister and the Chief Ministers of the Provinces, any groundwater policy that has a transboundary component that may be approved by the Council would implicitly carry the approval of the Provinces concerned. In this manner, a constitutionally mandated policy can set the tone for transboundary groundwater research and further cooperation. In addition, the Water and Power Authority has considerable capacity and experience in the field of hydrology and have the ability to carry out a groundwater study of the scale envisaged. Since the Provincial Irrigation Departments and PiDAs are responsible for management of groundwater, including monitoring of the water table and quality, a policy approved by the Council of Common Interests would obligate them to exercise these powers in collaboration with an aid of the Water and Power Development Authority.

2. In India
The Central Groundwater 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 nation-wide programmes for the prevention, control and abatement of environmental pollution and other measures as the Central Government deems necessary. The Authority consists of ex officio representation from the Central Groundwater 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 the Authority instructions to collaborate on the research described above.

An attempt to incorporate groundwater cooperation into the Indus Waters Treaty by introducing an amendment clearly defining rivers to include related aquifer systems. Hence, 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 and the waters of the same 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.

In conclusion, it is submitted that this paper is a first attempt to detail the provisions of the law relating to groundwater in the Indus Basin. It is expected that the different sub-themes touched upon by this paper will result in further research and investigation on the subject.

Firstly, this summary restricts itself to the laws of India and Pakistan. Further research is needed at the basin level. It is only when the groundwater laws of Afghanistan and China are also understood that a proper basin-wide understanding of the varying legal regimes can be developed and the institutions are identified that could result in Indus Basin cooperation on groundwater.

In analyzing the laws of India and Pakistan, this paper did not consider the Union/ Federal and State/ Provincial Rules of Business – the document that, inter alia, allocates responsibilities and roles of Ministries and Departments. Further research can reveal which government ministries, departments, offices and agencies would be responsible for managing groundwater. A policy and practice gap analysis can also be conducted by comparing the nature of responsibility allocated to a specific government ministry or department as against the nature of
groundwater challenge it faces.

This paper also does not consider groundwater 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 pollution of groundwater as a source of drinking water. The strength of the legal regime regulating groundwater can be assessed against their efficacy in meeting Sustainable Development Goals or other such indicators.

Lastly, the paper is weak in considering the gender dynamics that play out in the law and regulation of groundwater. Women, who constitute half the population, fetch water in rural areas and are greatly affected by changes in water availability, yet none of the laws surveyed carried any special mention or protection for women. A gendered critique of laws and the regulatory system would shed new light on the dynamics of water law in the region.

The proposed road map is presented in full realization of the practical difficulties Indo-Pak relations entails. There is room, however, for civil society and Non-Governmental Organizations to fill the void in research and carry on Track-II efforts that build on the above prescribed steps. In any event, if the road map sounds impossible, so does living without water.

References
5. Connecting the Drops, ibid. at p 14 and p. 16.
9. Ibid.
10. Ibid., pp. 4-5 and see Figure 1.
11. List III does have an entry for “Economic and Social Planning” and water, including ground water, may be indirectly covered by the purview of this entry as it is a significant input for agricultural and industrial development and is used in social planning.
13. Ibid., at p. 25.
14. Section 4 of the Indian Easements Act, 1882
15. Section 2(a) of the Indian Easements Act, 1882.
16. Section 7(g) of the Indian Easements Act, 1882
18. This paper does not consider the law regarding surface water and riparian rights as envisaged in the Indian Easements Act, 1882.
20. Cullet, Ibid, at p. 7. By way of example, much Common Law on ground water developed during the Industrial Revolution from disputes arising from rising conflicts between new industrial uses of water and long-standing agricultural uses.
21.
24. Section 17(1) (g) of the Water (Prevention and Control of Pollution) Act, 1974.
25. Section 2(j) Ibid.
27. Section 2(a) Ibid.
28. Section 6(2)(a) Ibid.
32. See, generally, Important Central Ground Water Authority Notifications etc. at
http://www.cgwb.gov.in/CGWA/Notifications.html


35. Section 5(1) Ibid.

36. Section 7(5) Ibid.

37. Section 8 Ibid.

38. Section 12 Ibid.


45. Article 243B of the Constitution of India.

46. Item 3, Eleventh Schedule, read with Article 243G, Ibid.

47. Article 243Q, Constitution of India.

48. Articles 243ZD and 243ZE, Ibid.

49. Item 5, Twelfth Schedule read with Article 243W, Ibid.


52. It is pointed out that navigation on tidal waters and fishing beyond territorial waters are both federal legislative subjects, but not relevant for the purposes of this paper.

53. Section 11 of the Water and Power Development Authority Act, 1958. It is pointed out that the control of the Water and Power Development Authority over underground water resources “shall be agreed to and notified by the Provincial Government.”


55. Section 8(1) and 8(2)(i) Ibid.

56. Section 11(1)(i)(a) Ibid.

57. See the preamble of the Canal and Drainage Act, 1873.

58. See Section 5, Ibid.


60. Section 26(1), Ibid.
62. Section 5(30) Ibid.
63. The Water Apportionment Accord (1991) is an agreement between the Provinces over their share of the waters of the Indus rivers. It is exclusively a surface water document and is not considered in this paper.
64. Preamble of the Sind Irrigation Act, 1879.
65. Section 3(1)(d), Ibid.
67. Vide Short Order dated 17 April 2015 passed in Writ Petition 7855 of 2015, the Lahore High Court directed the Lahore Development Authority to cease its development projects until local government elections in September 2015 and to proceed with such development only after the approval of locally elected governments.
69. Section 40(e), Ibid.
70. Section 2(xxxix), Ibid.
71. Section 54(1)(h)(i), Ibid.
72. Section 76(k), Ibid.
73. Entries No. 25 and 41, Part II, 5th Schedule read with Sections 191 and 192, Ibid.
74. Section 195, Ibid.
75. Item No. 48, Sixth Schedule, Ibid.
76. Sindh does not have comparable regulation of urban planning and development.
77. Section 1(3) of the Punjab Development of Cities Act, 1976. Rawalpindi, Multan, Faisalabad and Gujranwala, for example, are governed by Development Authorities established under the Development of Cities Act, 1976.
78. Section 29 of the Lahore Development Authority Act, 1975 and Section 28 of the Punjab Development of Cities Act, 1976.
79. Section 28(2) of the Punjab Development of Cities Act, 1976.
80. Section 29(2) of the Lahore Development Authority Act, 1975.
82. Item No. 9, Part II Optional Functions, Schedule II, Ibid.
83. Item 33, Part I, Schedule III, Ibid.
84. Item 40, Part II, Schedule III, Ibid.
85. Items 1and 26, Part III, Schedule III, Ibid.
86. Ibid. at p. 12.
87. See Case 3 mentioned in paragraph C.
89. “Connecting the Drops: An Indus Basin Roadmap for Cross-Border Water Research, Data Sharing and Policy Coordination (Stimson, Observer Research Foundation and Sustainable Policy Development Institute, 2013), pp. 49-50

91. Articles IV and V(1) and (II), ibid.


93. Article IX, ibid.

94. See Case No. 3, paragraph E(1) supra.

95. Article II of the Seoul Rules on International Groundwater, 1986

96. Article XIII, ibid.


98. See Articles 5 and 6, ibid.

99. Article 37, ibid.

100. Article 39, ibid.

101. Article 42(4), ibid.

102. Article 3(1) UN Watercourse Convention. Thus, even if India and Pakistan became signatories to the Convention, it would not override the provisions of the Indus Waters Treaty, 1960.


104. By extension, the UN Watercourse Convention does not apply to aquifers that do not share a common terminus, see Eckstein, G, “Implication of the UN Watercourse Convention for Groundwater Resources” available at http://www.internationalwaterlaw.org/blog/2014/08/05/professor-gabriel-eckstein-implications-of-the-un-watercourses-convention-for-groundwater-resources/

105. On the other hand, independent fossil aquifers and rain-fed aquifers would appear to be excluded by the UN Watercourse Convention, see Eckstein, ibid.

106. Article 6(1) of the UN Watercourses Convention.


109. Provincial entities can exercise power within territorial limits.
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