

I Stakeholder Meeting: Building partnerships and identification of main Water-Energy-Land Nexus challenges from the countries perspectives. Experiences from India and Pakistan

This first Indus stakeholder consultation included two country meetings: Delhi (23 March 2018) and Lahore (26-28 March 2018). The purpose of the two consultations was to strengthen and build partnerships with national organizations from the two countries and, given the political sensitivities, identify in a neutral environment what are the country perspectives on the sectoral and transboundary challenges.

The strategy developed to organize these and the subsequent meeting included the establishment of partnerships with local research organizations well connected within their respective countries and at the same interested in stayed engaged in the project. The entry point and local partner for India is The Energy Resources Institute (TERI), and for Pakistan, Lahore University of Management Sciences (LUMS). Each of these organizations supported the ISWEL team with the organization of the country meetings. Each of the two meetings was attended and facilitated by four IIASA Staff. UNIDO also attended meeting in Pakistan.



The specific objectives of the two meetings were:

- 1) Identify priority issues related to cross-sectoral and transboundary cooperation in the areas of water, energy, and land;
- 2) Engage with a number of selected organizations and experts that could support and contribute to the ISWEL project in the next stages and benefit from its outcomes.

The outcomes of the two meetings translated into: 1) Understanding on national sectoral and nexus challenges and priorities, and 2) mapping of key relevant stakeholder to be engaged in the next steps of the project. The meeting in India was attended by 23 participants, from 13 different organizations. In Pakistan, the meeting was attended by 34 participants from 15 different organizations. In the two meetings, stakeholders participating included academia, regional governments, think tanks, NGOs, and federal government. Table 1 provides a summary of the organizations participating the two meetings.

Sectoral challenges

The information gathered from the two meetings has been arranged and further developed with literature review inputs, to summarize the main sectoral and nexus challenges that riparian countries are facing. The challenges have been grouped around three main sectors to provide an overall picture for the basin.

Energy challenges

1. India and Pakistan are both facing important energy shortages. To address this gap, India has decided to exploit the hydropower potential of the Indus tributaries, all of which flow into Pakistan. In particular, there are five projects (Miyar Nallah, Lower Kalnai, Pakal Dul, Kishenganga and Ratle) being built,

- over which Pakistan has raised objections, since these could impact the flow regime of the Chenab and Jhelum river flows, from where Pakistan receives most of its surface water.
2. Pakistan is also looking into further developing hydropower to address the energy gap. Yet, 40% of the electricity is provided through hydropower. However, operations in the existing 3 dams in Pakistan are managed to secure access of water for irrigation, which has counterproductive effects for hydropower development and other sectors.
 3. Access to clean, reliable, and modern sources of energy is persistent gap in some of the riparian countries. In countries like Pakistan, 31% of the population are still lacking access to modern energy services, such as electricity, and about 63% of the population still relying on traditional biomass for cooking.

Table 1. Organizations participating in the first national consultations

Country	Organization participating
Pakistan	Lahore University of Management Sciences (LUMS)
	Ministry of Planning, Development and Reforms
	Planning and Development, Gov. Punjab
	Planning and Development, Gov. Baluchistan
	Planning and Development, Gov. Khyber Pakhtunkhwa
	LEADS
	Pakistan Meteorological Department (PMD)
	Pakistan Council on Research of Water Resources (PCRWR)
	Pakistan Agricultural Research Council (PARC)
	US Pakistan Center for Advanced Studies in Water, MUET
	Climate Change, Alternate Energy and Water Resources Institute (CAEWRI)
	Pakistan Business Council
	Water and Power Development Authority (WAPDA)
	Ministry of Planning, Development and Reforms
India	The Energy and Resources Institute-TERI
	Council on Energy, Environment and Water (CEEW)
	Department of soil and water conservation-Government of Punjab
	Indian Council for Research on International Economic Relations/IWMI
	Indian Institute of Technology (IIT) - Kharagpur
	Institute of Defense studies and Analysis (IDSA)
	Integrated Research and Action for Development (IRADe)
	International Development Research Center (IDRC)
	National Institute of Hydrology (NIH)
	National Institution for transforming India (NITI)-Aayog
	Technology Information, Forecasting and Assessment Council (TIFAC)
	TERI School of Advanced Studies
	The Celestial Earth
	United Nations Development Program (UNDP)

Water challenges

Resource availability and use

1. The climate in the basin is characterized by a high seasonality, with 85% of the annual water flows concentrated in the summer and only 15% during the winter. This requires optimal infrastructure to secure the availability of resources throughout the year, and this is yet insufficient in countries like Pakistan, which are highly dependent on the Indus water flows and which yet only have storage capacity of up to 30 days (equivalent to 13% of annual flows).

2. In terms of water users: agriculture is by far the largest water consumer, followed by municipal and industrial water supply across the basin. Afghanistan, but also the, Pakistan economies are very dependent on agriculture, and this translates into the provision of allocation priorities being given to irrigation over other sectors. This, in turn, causes numerous disputes (e.g. Islamabad facing water shortages, because water is first allocated for irrigators). This prioritization in Pakistan is also resulting in inefficient hydropower management. As shared in the stakeholder meetings, there is ample room for improving agricultural water management (through investments in new and upgraded irrigation infrastructure as well as development of technical capacities of farmers).
3. In terms of water sources, Afghanistan and Pakistan heavily rely on surface water (over 85% and 65%, respectively of total abstractions), while in India the share is more even (52% of abstractions derived from surface waters and 34% from groundwater). As indicated by both Indian and Pakistan stakeholders, water planning should be more focused on improving groundwater management and storage and not only focus on improving appropriation and storage of surface flows.
4. Existing monitoring and information systems on water availability and use are very deficient, which makes it very difficult to have accurate estimates on existing availability and use as well as making future projections and options that match the demand. Despite all the efforts, the available water balances of the basin are very uncertain and part of this is due to the lack of high quality data on precipitation and glacier dynamics.
5. Drivers like climate change and population growth are not being properly considered in the water planning strategies, and their consideration is of critical importance. For instance, in Pakistan 45% of the annual flows comes from snow and glacial ice melt. Climate change projections indicate an increase in the annual water flow in the years to come (resulting from glacier melting) but a sharp decrease in the medium run, which will heavily impact water availability in the country. Likewise, much of the water flow coming into Pakistan is already allocated, which raises many concerns as demands keep increasing. Particularly, when Population in Pakistan has multiplied by 10 (35 million in 1960s to 350 in 2050).

Governance

6. The Indus Water Treaty is a bi-lateral treaty between India and Pakistan that defines the rules under which both countries can use and manage flows of the Indus across the two countries. This treaty, however, does not reflect all of the main and future challenges (climate change, population growth, growing water needs from Afghanistan and China). Some stakeholders highlighted the need to shift the focus of the treaty from focusing on allocation of flows to focus on actual and future consumption and relocate accordingly. As indicated by some participants of the workshop, using a benefit sharing approach rather than an engineering river-dividing approach to water management between the two countries could deliver significant benefits.
7. Many of the problems around water management in the Indus basin are related to the political conflicts existing between India and Pakistan. From India perspective, the country is complying the agreements made under the Indus treaty. They argue that they are using less water on Eastern rivers than what agreed under the treaty. In Pakistan, water demand has been growing tailored to the flow excess that India was allowing, but India is now intended to make use of its total share, which puts Pakistan in a very challenging position. Addressing these conflicts is critical as 80% of the water flows in Pakistan are coming from India. The remaining 20% of the remaining water inflow comes from the Kabul river.
8. Disputes over water are not only on the transboundary setting but also at the provincial level within both India and Pakistan.
9. In India, energy subsidies scheme disincentives farmers from increasing water use efficiency, and this is the main cause of groundwater depletion. In fact, by increasing water use efficiency, most of the irrigation could be covered with surface waters, releasing the pressure on groundwater. A key question is where the investments should come from to upgrade the irrigation system.

10. Lack of coordination between water and agricultural government departments within the riparian countries, despite close relationship that exists between the two sectors. In Pakistan, 95% of surface waters is used for irrigation, and only 35% of the water diverted into canals reach the farms. The diverted waters that are lost usually contribute to artificial groundwater recharge and are responsible for much of the waterlogging problems. The inefficient irrigation practices and the lack of adequate drainage systems are also causing important soil salinization problems, which in turn are having large impacts of crop production and overall agricultural productivity
11. Groundwater is mismanaged despite the role it plays addressing much of the current water shortages (e.g. for urban users). So far there is no accounting on water extractions and 90% extractions are pumped with diesel pumps.
12. The lack of water monitoring systems and enforcement makes also very complicated to manage water effectively and this also causes leads to overexploitation.

Agricultural challenges

1. Agriculture represents a key socio-economic sector for many of the riparian countries, specially Pakistan, Afghanistan and India. The Indian part of the basin is critically important from a food security perspective as it represents India's breadbasket. Pakistan's Punjab also represents the country's food basket. In fact, 95% of the irrigated land of Pakistan is located within the basin, and this sector contributes to 20% of the national GDP and provides employment to more than 40% of the population.
2. Government interventions in the agricultural markets have forced the progressive specialization of the basin agriculture into low value crops that very water intensive and of low nutritional value (e.g. wheat and rice). This crop specialization translates into a mono-cropping system (winter wheat and summer rice) which has decreased the cultivated area of other less water intense crops like pulses, millet, vegetables and fruits. The generation of food surpluses for rice and wheat, has negative consequences for crops' price and lastly on farmers' economy. Also, this cropping pattern has implications beyond, as the burning of paddy crops residues is creating significant air and soil pollution problems.
3. Agricultural (economic) productivity is overall low across the basin and there are significant opportunities to increase it. But it is also important to realize that countries' economies need to be diversified as their development cannot rely on agricultural-based economies.
4. Soil degradation of agricultural land resulting from erosion, salinization, and pollution resulting from intensive use of inputs, are major challenges influencing agricultural productivity. Solutions to address these challenges require revisiting the subsidy schemes for energy, fertilizers, reform of commodity prices, and overall improving marketing and distribution of agriculture. This will also require revisiting the trade barriers.

Nexus challenges

Table 2 summarizes the main nexus challenges identified by the stakeholders from India and Pakistan, and with important implications from a transboundary perspective.

Table 2. Summary of key nexus challenges identified in the Zambezi and Indus Basins.

	Water-Energy	Water-Land	Energy-Land
Indus	<p>The basin is still facing an important energy deficit. Upstream countries (mostly India and Afghanistan) are focused on developing hydropower potential in the upper Indus. Issues at stake: little consideration of how Climate change might impact hydropower potential. Pakistan is highly dependent on surface water flows coming from India, and it is concerned how these developments will affect the quantity and timing of water flowing into their country. Pakistan also needs to develop its energy sector, and hydropower is one strong option, but will require multi-purpose strategies to avoid competition with priority use (irrigation). Energy subsidies in India have also contributed to unsustainable groundwater pumping, causing groundwater depletion and exacerbating soils salinization problems.</p>	<p>Majority of the waters from the Indus are allocated to irrigation. Issues at stake: Inefficient irrigation and lack of drainage systems is causing large problems of soil salinization and waterlogging, ultimately undermining the agricultural productivity. Most irrigated water is allocated to produce crops of low economic and nutritional value (rice and wheat). Prioritization of water for irrigation is causing important water conflicts with other users (e.g. urban, energy, industry).</p>	<p>Access to clean, reliable, and modern sources of energy is persistent gap in some of the riparian countries. Issues at stake: large part of the populations, especially in rural areas still rely on the use of biomass (fuelwood, animal dung, charcoal, and crop residues), which is causing soil degradation (removal of animal dung and crop residues reduces soil capacity to restore and maintain its fertility), and air pollution (indoor but also wide air pollution), and increased carbon emissions.</p>

