

ISSRA

INSTITUTE FOR STRATEGIC STUDIES, RESEARCH & ANALYSIS

Water

GOVERNANCE IN PAKISTAN

Challenges & Way Forward

Post Seminar Report

26-27 AUGUST, 2025



Institute For Strategic Studies, Research and Analysis (ISSRA)



WATER

GOVERNANCE IN PAKISTAN

Challenges & Way Forward

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Disclaimer: The discussions and report have followed Chatham House rule.

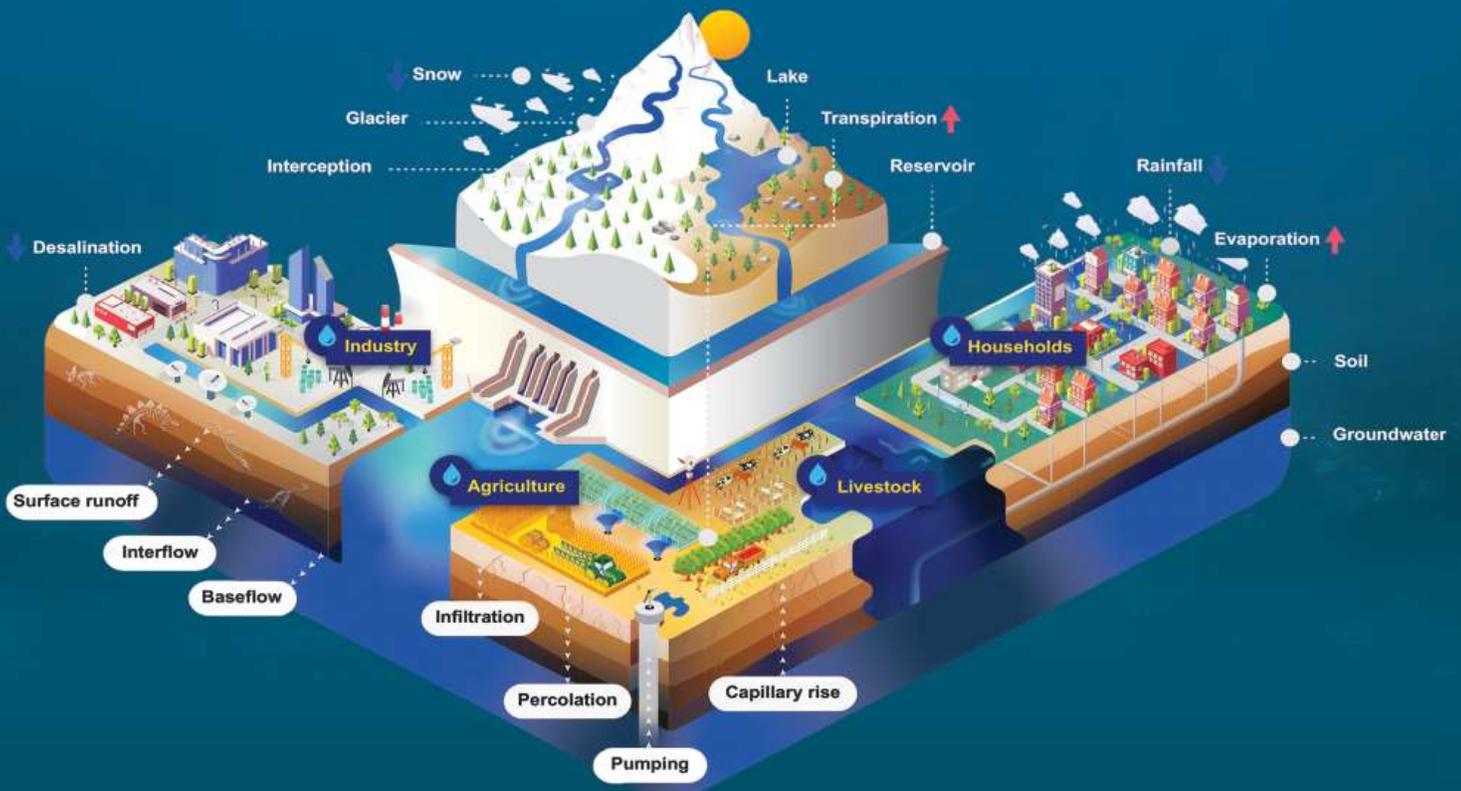
The statements, facts and opinions by speakers do not constitute the official policy of ISSRA/NDU.

CONCEPT NOTE

Pakistan's diverse water resources, including rainfall, glaciers, rivers, and the Indus Basin aquifer, are the lifeblood of its extensive Indus Basin Irrigation System (IBIS), a globally significant network crucial for agriculture. The Water Apportionment Accord (WAA) 1991 established the Indus River System Authority (IRSA) in 1992. IRSA is pivotal in estimating water flows during the Rabi and Kharif seasons and allocating water among the four provinces, according to the agreed shares outlined in the WAA 1991. Despite the WAA 1991 and the crucial mandate of IRSA, Pakistan grapples with significant water security challenges. The lower riparian provinces of Sindh and Baluchistan frequently voice concerns and a lack of trust regarding equitable water distribution, mainly when

river flows are low. Proposals for constructing new water storage facilities, such as the contentious Kalabagh Dam, and developing new irrigation canals have triggered serious inter-provincial disagreements. India's recent unilateral suspension of the Indus Waters Treaty (IWT) in April 2025 introduces complexity and uncertainty to Pakistan's strained water management landscape.

With this background, ISSRA, NDU had organised a two-day seminar and Roundtable discussion titled "Water Governance in Pakistan: Challenges and Way Forward." The event brought together policymakers, experts, and provincial representatives to collaboratively develop informed and practical recommendations, focusing on addressing the legitimate concerns of all provinces, particularly those facing the most acute water stress.



INTRODUCTION

A two-day National Seminar-cum-Roundtable Discussion on “Water Governance in Pakistan: Challenges and Way Forward” was held at the Institute for Strategic Studies, Research and Analysis (ISSRA), National Defence University (NDU), Islamabad, from 26–27 August 2025. The seminar featured two thematic sessions, in addition to the opening and closing sessions. The event was graced by Mr. Ashfaq Mahmood, former Secretary, Ministry of Water and Power, as the Chief Guest.

The thematic sessions brought together renowned water experts from each province, who shared their insights on the pressing challenges of water governance. The event witnessed participation from a diverse audience, including government officials, representatives of think tanks, academia, scholars, and university students, reflecting a broad national interest in water governance issues and their sustainable resolution. The Roundtable, in particular, included participants representing water expertise from across government departments, policy circles, and academic institutions.

The primary aim of the seminar was to critically evaluate Pakistan's interprovincial water disputes, identify governance gaps, and explore practical solutions for a sustainable path forward. In line with the theme, discussions emphasised the need for deeper cooperation and improved coordination among provinces, recognising the vital importance of water as a lifeline for Pakistan's economic development, agriculture, and social stability. The deliberations underscored that a collaborative federal approach is vital to tackle challenges related to water scarcity, equitable distribution, and effective management. The detailed Programme of the event is attached for reference.





PROGRAMME - SEMINAR

Time (Hrs)	Activity	Speakers	Venue
Opening Session			
1030-1035	Recitation	-	ISSRA Hall
1035-1045	Welcome Remarks	President NDU/DG ISSRA	"
1045-1055	Keynote address	Mr. Ashfaq Mahmood , Former Secretary, Ministry of Water and Power	
1055-1105	Group Photo	-	Colb Wall
<u>Session 1: Water Governance in Pakistan: Challenges and Way Forward</u>			
1105-1110	Introductory Remarks by Moderator	Ms. Zainab Naeem , Associate RF, SDPI, Islamabad	ISSRA Hall
1110-1120 (10 Mins)	IWT 1960 and the impact of its unilateral suspension by India	Syed Muhammad Mehar Ali Shah , Pakistan Commissioner for Indus Waters (PCIW)	
1120-1130 (10 Mins)	Water Apportionment Accord: Its Implementation and Role of IRSA	Syed Zahid Abbas , Former Chairman IRSA	"
1130-1140 (Mins)	Water availability and Inter-provincial water disputes	Mr. Asjad Intiaz Ali , Member, Federal, IRSA	"
1140-1150 (10 Mins)	The need for more storage and canals, highlighting recent monsoons, and the waste of water due to the non-availability of storage	Dr. Hasan Abbas , Former UNESCO Chair for Integrated Water Resources Management in Pakistan	"
1150-1220	Coffee Break		ISSRA Lounge
<u>Session 2: Water Governance in Pakistan: Challenges and Way Forward</u>			
1220-1230 (10 Mins)	Water Entitlement and Availability in Sindh Province: Challenges and Way Forward	Dr. Pervaiz Amir , Member BoD, Global Water Partnership (South Asia Chapter)	ISSRA Hall
1230-1240 (10 Mins)	Water Entitlement and Availability in Balochistan Province: Challenges and Way Forward	Mr. Bashir Tareen , Chief Engineer (Irrigation), and Provincial Coordinator (Water), Balochistan	"
1240-1250 (10 Mins)	Water Entitlement and Availability in Khyber Pakhtunkhwa Province: Challenges and Way Forward	Dr. Hifza Rasheed , DG, Pakistan Council of Research in Water Resources (PCRWR)	"
1250-1300 (10 Mins)	Water Entitlement and Availability in Punjab Province: Challenges and Way Forward	Dr. Atiq ur Rehman Tariq , Director, Center of Excellence in Water Resources Engineering, UET, Lahore	"
1300-1305	Stretch break		ISSRA Lounge
1305-1400	Q/A Session	-	ISSRA Hall
1400-1405	Closing Remarks by Moderator	-	"
<u>Closing Session</u>			
1405-1415	Vote of thanks	President NDU/DG ISSRA	"
1415-1420	Souvenir Ceremony	-	"
1420	Lunch	-	Banquet Hall



PROGRAMME - ROUNDTABLE DISCUSSION

Time (Hrs)	Topic/Activity	Details/Speakers	RV
1030-1100	Arrival of Participants	-	
1100-1105	Tilawat	-	Conf Room
1105-1110	Welcome Remarks	Maj Gen Muhammad Raza Aizad, HI (M) , DG ISSRA	"
1110-1115	Moderator Remarks	Mr. Ahmad Kamal Former Chief Engineering Adviser and Chairman of the Federal Flood Commission of the Ministry of Water Resources, Government of Pakistan.	"
1115-1123 (8 Mins)	In today's changing climate and rising water demands, does the 1991 Water Accord still meet our needs, or is there a need to review and update it for better provincial harmony and sustainability?	Asst Professor Dr. Akhtar Ali , Agricultural University, Peshawar, Khyber Pakhtoonkhwa	"
1123-1131 (8 Mins)	Why has Pakistan not been able to fully implement a reliable telemetry system for water monitoring, and what practical steps can ensure accurate and transparent water data sharing?	Mr. Amjad Saeed Member IRSA, Punjab	"
1131-1139 (8 Mins)	Should Pakistan construct and manage more Canals to address its water needs?	Muhammad Mohsin Leghari , Former Irrigation Minister of Punjab	"
1139-1320	Discussion	All Discussants	"
1320-1325	Closing Remarks	Mr. Ahmad Kamal	"
1325-1330	Vote of Thanks	Maj Gen Muhammad Raza Aizad, HI (M) , DG ISSRA	"
1330-1335	Group Photo	-	Colb Wall
1335 Onwards	Lunch	-	ISSRA Lounge



KEY TAKEAWAYS

- The Indus Waters Treaty (IWT)-1960, a binding international agreement and crucial for Pakistan's water security, was held in abeyance by India, which has violated international law, and has significantly contributed to water insecurity in Pakistan.
- Pakistan and Afghanistan urgently require a formal water treaty for the Kabul River Basin (KRB), where ongoing projects within Afghanistan could decrease flows to Pakistan by 16–17%, creating serious challenges for Pakistan's water supply. A cooperative agreement with Afghanistan, similar to the IWT, supported by international mediation, could reduce tensions and aid climate adaptation.
- The 1991 Water Apportionment Accord (WAA) ensured equitable sharing (Clause 2), surplus use (Clause 4), new reservoirs (Clause 6), and ecosystem protection (Clause 7), but neglect of these clauses has fueled disputes and shortages (WAA is attached as Annexure-A).
- Urgent action is needed to realise the broader vision of the Accord by developing vital storage infrastructure, maximising the use of water shares allocated to KP and Balochistan through increased infrastructure development, and boosting cooperation among provinces.
- The Accord should be reviewed to address emerging challenges such as climate change and its impacts, seawater intrusion, environmental flows in the Indus River system, over-extraction of groundwater, and the inclusion of hill torrents through provincial consensus.
- The 2018 National Water Policy mandates a national water database to improve governance and fair distribution. The Ministry of Water Resources should lead its implementation with IRSA, WAPDA, PCRWR, and provincial irrigation departments to ensure effective data collection, monitoring, and national water harmony.
- Large dams remain crucial for Pakistan's long-term water and energy security, as the country's storage capacity is only about 10% of annual river flows, equivalent to 30 days of water, compared to the global benchmark of nearly 40% (India 170 and USA 900 days). While ongoing projects such as Diamer-Basha, Dasu, and Mohmand require timely completion with assured funding, the Kalabagh Dam also holds strategic importance. Its natural location and capacity of 7.9 MAF (6.1 MAF live storage) make it a highly viable option to conserve surplus monsoon flows, regulate downstream supply, and generate low-cost hydropower.
- Pakistan may also tap into its 500 MAF of riverine aquifers. This untapped resource is estimated to supply silt-free water year-round, enable multiple cropping cycles, and recover costs within 2–3 years, offering a faster and more sustainable path to water security. However, the concept needs to be tested through a small scale pilot project
- Managing natural floodplains, wetlands, and doabs through off-channel storage, diversions, recharge basins, and zoning could turn them into assets, storing 3–6 MAF of water, recharging groundwater, supporting irrigation, and ensuring Sindh's downstream flows under the WAA.



- Pakistan lacks reliable data on how tributaries, local streams, secondary, and tertiary rivers feed into the central Indus River System, weakening national water forecasts, especially during monsoons. The already formulated national flood telemetry master plan needs implementation to support IRSA's telemetry system, achieve precision in flood forecasting, strengthen the water database, and further improve the accuracy of surface water availability.
- IRSA manages water distribution, but provincial mistrust limits its effectiveness. A new telemetry project at 27 sites and KP's installation of systems on 11 canals show progress. Sharing data openly, maintaining systems properly, and ensuring independent and competent management will help build trust within the provinces. Future satellite-based monitoring with support from SUPARCO could further reduce conflicts.
- Encroachment on rivers and drains blocks natural flows, causing floods, waterlogging, and reduced irrigation. Removing illegal structures and enforcing floodplain rules is vital to protect lives, livelihoods, and agriculture from climate risks.
- Punjab's water security depends on modernising irrigation, shifting from water-intensive crops to water-efficient cropping patterns, and exploring riverine storage as a sustainable complement to large reservoirs.
- Ensuring a continuous flow downstream of Kotri Barrage is vital to protect the Indus Delta and biodiversity. Sindh should enforce floodplain zoning, remove encroachments, restore wetlands, harness hill torrents, and build small dams for long-term sustainability.
- The Sindh Barrage project is proposed to be situated 45 km upstream of where the Indus River meets the sea and is designed to improve water security and ecological resilience of Sindh by storing between 2.0 and 3.0 MAF and regulating water for irrigation and domestic supplies, including 1,000 MGD for Karachi. The project should be prioritised and completed as early as possible by the Federal Government.
- KP contributes 30 MAF but uses only 6 of its 8.78 MAF share, with 2.81 MAF unused. Building new canals, storage facilities, and mini-hydropower, along with efficient irrigation, can boost food security, livelihoods, and energy resilience.
- Balochistan faces acute water scarcity and needs local storage, groundwater recharge, drip irrigation, rainwater harvesting, and drought-tolerant crops. Completing the Kachhi Canal to serve 700,000 acres is essential for the province's agriculture.
- A shift to Integrated Water Resources Management (IWRM) is crucial for Pakistan, as it links technology, governance, and public awareness to ensure long-term water security and resilience against climate challenges.



INAUGURAL SESSION

- The unilateral suspension of the IWT by India has introduced regional uncertainty, directly threatening Pakistan's food, energy, and human security, and highlighting the need for stronger transboundary water diplomacy.
- Pakistan's water governance is rooted in the 1991 Water Accord, which has managed provincial distribution for decades during the Rabi and Kharif seasons annually. However, due to rising water scarcity caused mainly by climate and temperature variability, it faces increasing pressure from climate change, population growth, and governance deficiencies that require urgent reforms.
- Domestic political polarisation over the construction of new canals and reservoirs complicates national consensus on water priorities, delaying critical investments in storage and irrigation infrastructure.
- Effective water governance is directly tied to Pakistan's food self-sufficiency and energy sustainability. Agriculture, the backbone of the economy, requires consistent and reliable water supplies. At the same time, energy generation also depends on balanced and judicious water management.
- Pakistan urgently needs to curb water losses, modernise irrigation infrastructure and operations, and adopt innovative technologies in water management, agriculture productivity, and storage to cope with persistently intensifying pressures on its hydrological systems.
- Building water resilience requires stronger institutions, improved infrastructure, well-defined operations and greater community-level awareness so that local users become active stakeholders in conservation and equitable distribution.
- With responsible stewardship, integrated planning, and all-inclusive cooperative governance, Pakistan can transform its water resources from a source of dispute into an instrument of national cohesion, stability, and sustainable growth.



DAY 1
SEMINAR

**Water Governance in Pakistan:
Challenges and Way Forward**





SESSION-I

- The IWT of 1960, signed between India and Pakistan with the limited involvement of the World Bank, remains legally binding until it is terminated or altered through a new ratified treaty.
- The Treaty grants unrestricted rights to India over eastern rivers (Sutlej, Beas, Ravi), while Pakistan has limited rights over western rivers (Indus, Jhelum, Chenab).
- Pakistan's permitted uses on Eastern rivers include domestic consumption, non-consumptive uses (navigation, fishing, flood protection), limited irrigation of up to 1.3 million acres, and hydropower generation with storage of up to 3.6 MAF.
- India's construction of major dams and hydropower projects on both Eastern and Western rivers has significantly decreased Pakistan's water supply. By 2030, an additional 14 projects on Western rivers with a capacity of 3,246 MW are expected to worsen the pressure.
- Pakistan developed storages like Tarbela (5.7 MAF), Mangla (7.3 MAF), and Chashma (0.3 MAF), totalling 13.3 MAF, though siltation continues to reduce adequate capacity.
- Pakistan's per capita water availability has fallen from 5,600 m³ in 1947 to less than 1,000 m³ today, classifying it as a water-scarce country. The nation's water storage capacity is only 30 days, which is significantly lower than international benchmarks (India: 170 days, USA: 900 days).





- Water governance encounters challenges such as political disputes, poor infrastructure maintenance, environmental decline, and inaccurate measurement systems.
- Provincial disputes over water distribution have long-standing roots dating back to pre-partition canal projects and still influence trust.
- The WAA1991 allocated the waters of the Indus Basin among the provinces as follows: Punjab 55.94 MAF, Sindh 48.76 MAF, Khyber Pakhtunkhwa 8.78 MAF, and Balochistan 3.87 MAF, along with 12.3 MAF for system losses, resulting in a total of 117.35 MAF. In percentage terms, this corresponds to Punjab 48.2%, Sindh 42%, KP 7.6%, and Balochistan 3.3% of the remaining supplies.
- To implement the Accord, the IRSA was established in 1992. IRSA regulates and distributes water among provinces, oversees reservoir operations, and convenes Advisory Committees before each cropping season (Kharif and Rabi) to determine allocations based on actual flows and storage levels. Disputes within IRSA are generally settled by majority vote. Still, unresolved matters can be referred to the Council of Common Interests (CCI) for a final decision as per the IRSA Act.
- To improve transparency, a telemetry project with 27 real-time monitoring stations across the Indus Basin is underway, aiming to ensure precise distribution and build trust within provinces. Additionally, satellite-based monitoring supported by SUPARCO could help in reducing conflicts.
- Pakistan's current water governance approach relies heavily on mega-dams as the leading storage solution, while mainly responding to floods through post-disaster relief. This model is further weakened by encroachments and unregulated land use along rivers, fragmented governance characterised by inter-provincial disputes, and dependence on outdated early warning systems.





- A balanced strategy is essential, combining complex infrastructure such as dams, barrages, and canals with soft, nature-based solutions like wetlands and aquifers. Pakistan should manage groundwater extraction through licensing, zoning, and incentives for efficient pumping technologies.
- A study indicates that Pakistan holds a natural reserve of 500 million acre-feet (MAF) of drinking-quality water within riverine aquifers. The research outlined the technology, costs, and management strategies needed to utilise this untapped resource, which could effectively make Pakistan drought-proof. This solution is considerably simpler to develop and manage than traditional approaches involving dams, barrages, and canals.
- A pilot project should be established to demonstrate how the riverine aquifer can be connected to a large irrigated area (say 50 thousand acres) and supply silt-free freshwater for efficient, year-round irrigation systems with a 24/7 water supply. This would enable the irrigated land to support up to three crops annually. It is claimed that such a project can recover its costs through high agricultural yields within 2 to 3 years, rendering the entire operation economically viable.

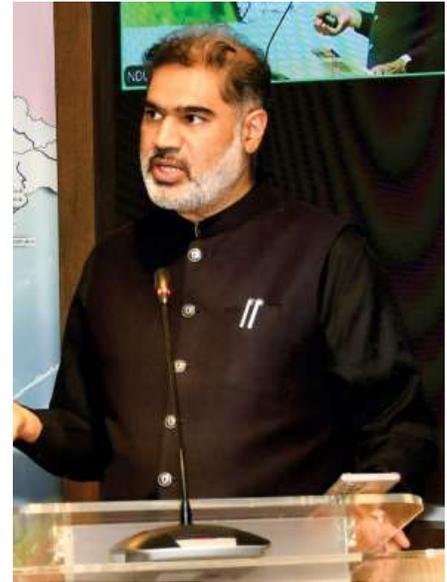




SESSION-II

Punjab

- Punjab receives 55.94 million acre-feet (MAF) annually under the 1991 WAA, making it the largest recipient of the Indus Basin system. This substantial share reflects its extensive canal command area and agricultural prominence.
- Despite this allocation, Punjab faces severe water stress due to its high population density, intensive agricultural practices, and increasing industrial demand.
- Surface water availability varies significantly, influenced by seasonal flows, upstream withdrawals, and climate-related shortages. This fluctuation often introduces uncertainty into provincial irrigation planning.
- Punjab relies heavily on groundwater extraction, which now supplies over 40% of irrigation needs. Excessive pumping has caused alarming aquifer depletion, increased salinity, and widespread arsenic contamination in groundwater sources.
- Outdated irrigation methods and deteriorating canal infrastructure lead to substantial conveyance losses (estimated at 30–40%), creating significant inequalities between head-end and tail-end farmers.
- Water-intensive crops like rice and sugarcane dominate Punjab's crop pattern. This causes inefficiency, worsens waterlogging and salinity, and threatens sustainable water management.
- Weak enforcement of equitable distribution, lack of volumetric delivery, and the absence of modern telemetry systems compromise the transparent implementation of the Accord.
- Climate change has intensified Punjab's vulnerability to both floods and droughts, disrupting agriculture and damaging infrastructure.
- Rising interprovincial tensions, particularly with Sindh, stem from perceptions that Punjab withdraws disproportionately without transparent monitoring systems.
- In the future, Punjab must guarantee transparent distribution via telemetry and independent audits at all major barrages.
- Modernise irrigation infrastructure, including lining canals, and reduce conveyance losses to ensure equitable delivery.





- Revise cropping patterns by discouraging rice and sugarcane and encouraging diverse, climate-resilient crops.
- Increase water storage capacity with small and medium-sized dams to buffer seasonal shortages.
- Implement water pricing and incentive schemes to promote conservation and efficiency.
- Foster trust with other provinces through transparent data sharing, collaborative monitoring mechanisms, and confidence-building measures.
- Enhance institutional capacity by empowering provincial water authorities and improving coordination among the agriculture, irrigation, and environment sectors.

Sindh

- Sindh is the lower riparian province and relies heavily on the flow of the Indus River for agriculture, drinking water, and ecosystems. It often feels that its water entitlements under the 1991 Accord are not fully respected due to upstream withdrawals and the absence of transparent monitoring.
- Climate change has significantly worsened water stress in Sindh: rising temperatures, unpredictable monsoons, disappearing winters, and quicker glacial melt have decreased overall water supply, especially for agriculture and household use.
- The province has faced devastating floods, most recently in 2022 and again in 2025, which caused large-scale displacement, crop destruction, and damage to infrastructure, while prolonged dry spells and droughts continue to threaten rural livelihoods.
- Groundwater recharge has decreased due to diminished river flows and excessive extraction, causing aquifers to become more depleted. In coastal districts, seawater intrusion has further contaminated freshwater sources and jeopardised agriculture and drinking water supplies.
- Outdated and poorly maintained irrigation infrastructure causes high conveyance losses and unfair distribution between head- and tail-end farmers, decreasing system efficiency.
- Inefficient water use across agriculture, industry, and households—alongside cropping patterns dominated by water-intensive crops—exacerbates stress on already scarce resources.
- Weak institutional capacity, fragmented responsibilities, limited monitoring systems, and inadequate enforcement of regulations hinder effective water resources governance.





- Financial constraints limit the province's capacity to invest in modern water infrastructure, while social inequalities leave vulnerable populations disproportionately exposed to scarcity and disasters.
- Political economy interests and external pressures, including India's upstream water policies, further complicate Sindh's already fragile water governance.
- To ensure sustainability, Sindh must adopt integrated water resources management (IWRM), prioritising efficient irrigation (drip and sprinkler systems), water-smart farming, and drought-resistant crops to maximise productivity with limited supplies.
- Infrastructure investment should prioritise rehabilitating existing reservoirs, building small and medium-sized dams, expanding rainwater harvesting, and encouraging groundwater recharge through urban canals, ponds, and check dams.
- Distribution networks need modernising to cut losses, ensure fair access, and enhance delivery to tail-end farmers.
- Governance must be reinforced through clearer institutional roles, improved inter-provincial cooperation, and strong regulatory frameworks for fair resource allocation and pollution prevention.
- Advanced monitoring systems, including telemetry and satellite-based data, are essential for transparent water accounting, better forecasting, and fostering trust among stakeholders.
- Public awareness campaigns, reforms in cropping patterns, and active community involvement in water planning and decision-making will be crucial for building resilience and securing long-term water security in Sindh.

Khyber Pakhtunkhwa (KP)

- KP's allocation under the 1991 Accord is 8.78 MAF (7.6% of the Indus Basin waters). Of this, about 5.97 MAF is utilised annually, while 2.81 MAF remains unutilised due to limited storage and distribution infrastructure.
- Despite being a water-rich province, KP struggles to utilise its full entitlement. Its principal rivers, Swat, Kabul, Kurram, Panjkora, and Tochi, contribute nearly 30 MAF annually to the Indus Basin. However, much of this flows downstream to Punjab due to inadequate canals and storage facilities in KP.
- The Chashma Right Bank Canal (Lift Scheme), allocated 0.78 MAF (later revised to 1.178 MAF), remains the main canal scheme for KP. However, many planned irrigation projects have not been completed, leaving significant potential untapped.



- Although the 18th Constitutional Amendment granted KP the authority to develop its own infrastructure, its share remains underutilised due to financial, technical, and political limitations.
- KP also faces increasing pressure on groundwater resources. Over 37,000 tube wells pump around 4 MAF annually, leading to unsustainable depletion. The proportion of land experiencing groundwater stress has risen from 24.6% in 2014 to over 32% in recent years.
- The way forward is to build new canals and storage facilities to capture floodwaters and utilise their full Accord entitlement.
- Secure a fair proportionate share in all new dams (such as Diamer-Bhasha and Dasu) being constructed under federal projects.
- Encourage the use of water-efficient irrigation methods such as drip and sprinkler systems to optimise productivity.
- Promote the combined use of surface and groundwater for sustainable resource management.
- Strengthen provincial water institutions for planning, monitoring, and coordinating across irrigation, agriculture, and energy sectors.
- Improve farmers' awareness and skills in sustainable water techniques to minimise waste and reduce reliance on tube wells.

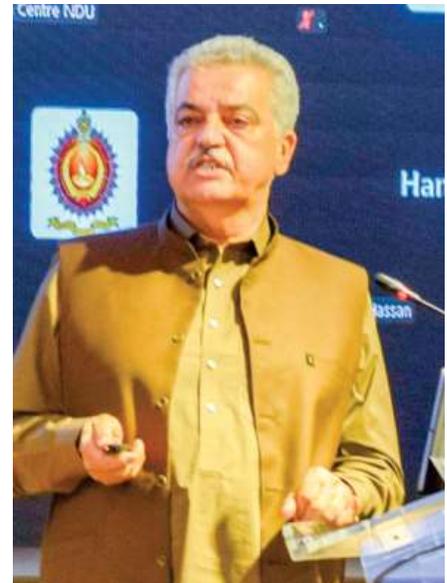


Balochistan

- Balochistan suffers from persistent water scarcity despite possessing substantial groundwater and surface water resources.
- Inadequate surface water share (only 3.87 MAF annually under IRSA) is insufficient for the extensive command area.
- Seasonal variation, climate change, and upstream withdrawals further decrease actual canal deliveries.
- Weak enforcement of the 1991 Accord continues due to the lack of volumetric deliverability and limited transparency in water flow monitoring at barrages and inter-provincial boundaries.
- Poor infrastructure, outdated canals, inadequate lining, storage limitations, and distribution inequity worsen losses and decrease efficiency.



- Institutional and legal gaps persist: Balochistan's water policy remains unapproved, there is no provincial water authority, and weak departmental coordination leaves entitlement disputes unresolved.
- Over-reliance on groundwater (over 80% usage) with unregulated pumping through solar tube wells, and the absence of a groundwater rights framework, results in unchecked extraction, further depletion, and social inequalities.
- Consequences include decreased crop yields, urban water shortages (particularly in Quetta), disputes over water rights, drying of barrages, and environmental deterioration.
- The way forward lies in ensuring the delivery of Balochistan's IRSA share through proper monitoring and transparent measurement at inter-provincial points.
- Invest in storage facilities, canal lining, and water-saving technologies.
- Establish a Balochistan Water Authority to oversee the allocation, regulation, and dispute resolution.
- Initiate community engagement and collaborate with stakeholders for sustainable water use.





CLOSING SESSION

- Pakistan's current reliance on mega-dams as the leading solution limits flexibility and regional fairness; small and medium dams in provinces can offer localized storage, boost resilience, and lessen dependence on single mega-structures.
- Flood management must transition from a reactive, relief-based approach to proactive resilience, involving spatial planning, mapping vulnerable zones, and rigid protection of riverbanks and floodplains against encroachments.
- Adopting the “Room for the River” approach by restoring natural waterways and rehabilitating traditional flood paths will provide rivers with the necessary space to absorb excess flows and minimise disaster risks.
- Pakistan's governance challenges demand more effective inter-provincial cooperation models, taking cues from international practices (e.g., USSR/Central Asia), where shared water resources are managed collectively despite political differences.
- Alongside complex infrastructure such as barrages and dikes, Pakistan should adopt soft, nature-based solutions, including wetlands restoration, aquifer recharge, and sustainable land use to achieve balanced flood resilience.
- Soil and terrain testing should be carried out to identify natural recharge zones, ensuring groundwater replenishment and long-term water security.
- Modernise monitoring by implementing satellite-based systems and community weather stations, enabling real-time data collection, forecasting, and early warning systems tailored to local needs.
- Boost community disaster readiness through local forums, user-friendly early-warning systems, and decentralised response mechanisms, ensuring ownership and faster action on the ground.
- The recent monsoon season has caused devastating flash floods and high floods across Pakistan. However, due to insufficient water storage capacity, much of this water has once again been lost to the Arabian Sea, representing a missed opportunity for irrigation, hydropower generation, and drinking water supply.
- Looking ahead, if Pakistan's water crises are managed wisely, water resources can become a source of unity, resilience, and prosperity rather than contention, destruction, and scarcity.



DAY 2
ROUNDTABLE DISCUSSION

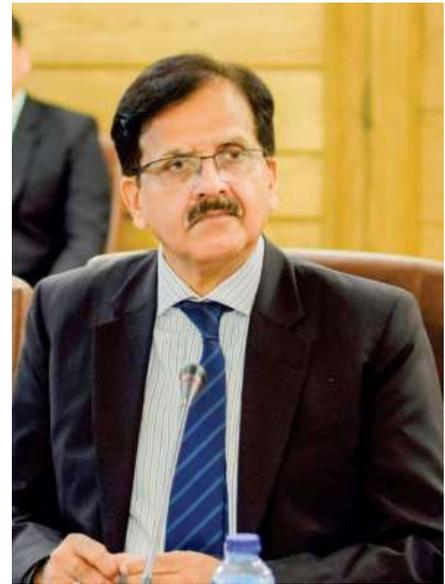
**Water Governance in Pakistan:
Challenges and Way Forward**





ROUNDTABLE DISCUSSION

- The outdated colonial-era water governance system is no longer adequate for current challenges. Pakistan requires a unified water governance framework that reinforces institutions like IRSA, creates basin-level management bodies, promotes research-based policymaking, tackles corruption, and combines structural and institutional reforms with local perspectives.
- The 1991 WAA, while a significant milestone, now requires more flexibility to address seasonal variations caused by floods, droughts, and irregular river flows. Groundwater and hill torrents should also be officially recognised and incorporated into the Accord to ensure a comprehensive approach.
- Pakistan's inadequate water storage capacity is a critical issue that demands substantial investment in new reservoirs, dams, and modern storage technologies to address current and future needs.
- The irrigation system, including canals and water conveyance infrastructure, must be upgraded and modernised to reduce losses, which remain unacceptably high under the current outdated structures.
- Water distribution mechanisms should shift from rigid and fixed formulas to adaptable systems that respond to changing hydrological realities and provincial needs.
- Water distribution among provinces should be based on their performance in conserving water, promoting efficient use, and encouraging sustainable agricultural practices, thereby fostering a sense of responsibility and fairness in allocation.
- Every province must develop and implement comprehensive water management strategies that align with national water priorities, ensuring local measures support national objectives.
- One perspective emphasised that the priority should be to implement the existing system effectively. Only after its performance is assessed should revisions to the Accord or governance framework be considered.
- Another viewpoint proposed that the Accord could also be reviewed to address emerging challenges such as climate change and its impacts, seawater intrusion, environmental flows in the Indus River system, overexploitation of groundwater, and the inclusion of hill torrents through provincial consensus.





- It is crucial to formally incorporate Azad Jammu and Kashmir (AJ&K) and Gilgit-Baltistan (GB) into the Water Accord framework, as they are directly connected to the Indus Basin. Their acknowledgement and integration will promote a more inclusive and comprehensive water governance structure.
- A significant gap is that policy implementation is not included in the Water Accord. There is no accountability mechanism, and the Accord itself was built using outdated data, making reforms and accountability structures necessary.
- Governance issues continue to be a significant obstacle. Overlapping mandates, lack of transparency, political interference, and institutional inefficiencies have fostered mistrust among provinces. A collaborative federal approach is essential to resolve these disputes more effectively.
- A cross-sectoral and multi-entity decision-making platform is necessary to integrate IRSA, WAPDA, provincial departments, and relevant ministries of agriculture and environment, covering the entire basin comprehensively and ensuring coherence in governance.
- Political will is crucial for water reforms. Without genuine commitment, even well-crafted policies will fail. There should be a single clear national water policy, with provinces free to develop their own strategies to implement it, instead of pursuing conflicting approaches.
- Water accounts are prepared every ten days using provincial flow data in accordance with clause 8(c) of the IRSA Act. Still, provinces often raise objections, accusing each other of misreporting canal withdrawals and river flows.
- To resolve disputes, a telemetry system was introduced in 2002 at 24 sites, with WAPDA acting as the executing agency, EPC as the contractor, and NESPAK as the consultant. The initiative failed because its data conflicted with provincial records, provinces were not consulted during the design, and IRSA lacked both the technical capacity and funds for system maintenance. The system was eventually abandoned in 2015.
- In 2021, the project was revived with installations at 30 sites at a cost of 23 billion rupees, again involving WAPDA, EPC, and NESPAK in their original roles. This time, lessons from the past were applied: steering and consensus committees with provincial participation were established, and critical components such as GPS and water-level sensors were successfully integrated. However, financial and governance challenges persist.





- To improve accountability, the measures include addressing IRSA's funding shortages by increasing water cess approved by the government and CCI, amending the IRSA Act to give IRSA the primary responsibility for monitoring water flow based on telemetry data rather than provincial reports, and empowering it to impose penalties for under- or over-reporting.
- Large dams remain essential for Pakistan's long-term water and energy security, as the current water storage levels are significantly below the global benchmark. The prompt completion of ongoing projects on the Indus River, such as Diamer-Bhasha, Dasu, and Mohmand, should be given priority with secure financing.
- The construction of Kalabagh Dam, despite political controversy, remains strategically significant: it could provide substantial storage capacity, regulate seasonal flows downstream—particularly during high monsoon periods, alleviate Sindh's deltaic concerns by ensuring controlled downstream releases, and produce low-cost hydropower.
- Pakistan currently lacks enough water to meet its existing needs; therefore, before building new canals, the priority should be to address the shortage through better large and small storage, efficiency, and conservation.
- New canals should only be considered at the federal level after reaching consensus among the provinces, as unilateral construction risks causing inter-provincial disputes and mistrust.
- The Sindh Barrage, vital for Sindh's water security and Karachi's 1,000 MGD supply, must be prioritised and completed swiftly by the Federal Government.
- It is recognised that the current canal structure has been altered and needs repair, so existing systems should be rehabilitated before investing in new ones.





- Urban planning and agricultural planning need to align with canal expansion; without integrated land-use policies, canals alone cannot solve water scarcity.
- Canals alone cannot solve Pakistan's water crisis; they must be included in an integrated approach that involves rainwater harvesting, groundwater recharge, and improved irrigation practices.
- Pakistan and Afghanistan need a formal Kabul River Basin treaty, where ongoing projects within Afghanistan could decrease flows to Pakistan by 16–17%. A cooperative agreement with Afghanistan, similar to the IWT, supported by international mediation, could reduce tensions and aid climate adaptation.
- To ensure efficiency and resilience, drainage must be integrated with the water supply. Simultaneously, rising flood risks and tensions over the IWT require a strategic assessment of the Indus Basin's resources and vulnerabilities.





ISSRA COLLABORATION



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Annexure – A

WAA 1991 - TEXT OF THE AGREEMENT

- (1) There was an agreement that the issue relating to apportionment of the water of the Indus River System should be settled as quickly as possible.
- (2) In the light of the accepted water distributional principles the following apportionment was agreed to: -

(Fig. in MAP)

PROVINCE	KHARIF	RABI	TOTAL
PUNJAB	37.07	18.87	55.94
SINDH*	33.94	14.82	48.76
N.W.F. P (a)	3.48	2.30	5.78
(b) CIVIL CANALS* * 1.80	1.80	1.20	3.00
BALUCHISTAN	2.85	1.02	3.87
	<u>77.34</u>	<u>37.01</u>	<u>114.35</u>
	+	+	+
	1.80	1.20	3.00

- Including already sanctioned Urban and Industrial users for Metropolitan Karachi.
- Ungauged Civil Canals above the rim stations.

- (3) N.W. F.P / Balochistan Projects which are under execution have been provided their authorized quota of water as existing uses.
- (4) Balance river supplies (including flood supplies and future storages) shall be distributed as below: -

<u>Punjab</u>	<u>Sindh</u>	<u>Balochistan</u>	<u>NWFP</u>	<u>Total</u>
37%	37%	12%	14%	100%

- (5) Industrial and Urban Water supplies for Metropolitan city, for which there were sanctioned allocations will be accorded priority.
- (6) The need for storages, wherever feasible on the Indus and other rivers was admitted and recognized by the participants for planned future agricultural development.
- (7) The need for certain minimum escape to sea, below Kotri, to check sea intrusion was recognized. Sindh held the view, that the optimum level was 10 M.A.F., which was discussed at length, while other studies indicated lower/higher figures. It was therefore, decided that further studies would be undertaken to establish the minimal escape needs downstream Kotri.



- (8) There would be no restrictions on the Provinces to undertake new projects within their agreed shares.
- (9) No restrictions are placed on small schemes not exceeding 5000 acres above elevation of 1200 ft. SPD.
- (10) No restrictions are placed on developing irrigation user in the Kurram/Gomal/Kohat basins, so long as these do not adversely affect the existing uses on these rivers.
- (11) There are no restrictions on Balochistan, to develop the water resources of the Indus right bank tributaries, flowing through its areas.
- (12) The requirements of LBOD will be met out of the flood supplies in accordance with the agreed sharing formula.
- (13) For the implementation of this accord, the need to establish an Indus River System Authority was recognized and accepted. It would have headquarters at Lahore and would have representation from all the four provinces.
- (14)
 - (a) The system-wise allocation will be worked out separately, on ten daily basis and will be attached with this agreement as part and parcel of it.
 - (b) The record of actual average system uses for the period 1977-82, would form the guide line for developing a future regulations pattern. These ten daily uses would be adjusted pro-rata to correspond to the indicated seasonal allocations of the different canal systems and would form the basis for sharing storages and surpluses on all Pakistan basis.
 - (c) The existing reservoirs would be operated with priority for the irrigation uses of the Provinces.
 - (d) The provinces will have the freedom within their allocations to modify system-wise and period-wise uses.
 - (e) All efforts would be made to avoid wastages. Any surpluses may be used by another province, but this would not establish any rights to such uses.



PHOTO GALLERY





Conversations



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