PAKISTAN COUNCIL OF RESEARCH IN WATER RESOURCES

PCRWR

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ANNUAL REPORT 2023-24

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Editorial Board

Foreword

In a world increasingly defined by the dual crises of water scarcity and climate change, the Pakistan Council of Research in Water Resources (PCRWR) has continued to demonstrate its commitment to advancing water security and sustainability in Pakistan. The year 2023-24 has been a remarkable period for PCRWR, marked by innovative research, strategic collaborations, and impactful projects that address the pressing water-related challenges faced by the nation.

PCRWR efforts have not only focused on traditional water management but have also embraced integrated approaches to enhance the resilience and sustainability of water resources. From groundwater assessment and adaptive irrigation techniques to the development of comprehensive water quality assessments, PCRWR has been at the forefront of ensuring that the country's water needs are met while safeguarding public health and the environment.

A significant highlight of this year has been the expansion of our water quality monitoring network across both rural and urban areas. This initiative identified critical challenges such as microbial contamination, chemical pollutants, and the presence of heavy metals, disseminated findings drove an improvement in water treatment and filtration systems in the provinces. Our work on the surface water bodies has highlighted key pollution issues, emphasizing the need for enhanced interprovincial pollution control mechanism. Our project on sea water intrusion and coastal erosion along the Sindh and Balochistan coasts has also provided valuable insights for coastal management.

Moreover, we have pioneered the use of innovative approaches such as hybrid wetlands for wastewater treatment, which earned UNESCO Global Ecohydrology Recognition, and have launched several key studies including the Impact Assessment of Indus Waters Treaty on Command Areas of Eastern Rivers and the Mapping of Water Resources in Islamabad. These initiatives, along with our expanded efforts in groundwater recharge projects in Balochistan Khyber Pakhtunkhwa and Islamabad, demonstrate our dedication to addressing the multifaceted challenges of water management.

PCRWR has also strengthened its global partnerships, recognizing that water issues are not confined by borders and require collective action. Collaborations with international organizations, research institutes, and local communities have been pivotal in developing practical solutions for water management and water quality, thus promoting water conservation practices across the country.

As we navigate the complexities of climate change and its impact on our water resources, our commitment to securing Pakistan's water future remains unwavering. This annual report is a testament to the hard work and dedication of our team, partners, and stakeholders who have worked tirelessly to translate our vision into reality. Our research will not only address immediate water and climate challenges but will also support meeting the objectives set in the National Water Policy 2018 and aligned policies, enabling continuous improvement approaches for sustainable water management.

Dr. Hifza Rasheed
Director General, PCRWR

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About PCRWR

Introduction

PCRWR is an apex research body of Ministry of Water Resources and is the only organization in water sector at federal level. It is mandated to conduct, organize, coordinate and promote research on all aspects of water resources including irrigation (surface and groundwater), drainage, soil reclamation, drinking water, rainwater harvesting, etc. With its headquarters at Islamabad, it has eight Regional Offices located at Lahore, Karachi, Quetta, Bahawalpur, Peshawar, Tandojam, Gilgit and Muzaffarabad besides having 24 water quality testing laboratories and seven research and demonstration farms across the country.

The Council was established in 1964, under a resolution and named as Irrigation, Drainage and Flood Control Research Council (IDFCRC) under the Ministry of Natural Resources. Later it was renamed as Pakistan Council of Research in Water Resources in 1985 under the administrative control of Ministry of Science and Technology. In 2007, it was given the status of a corporate body through an Act of Parliament. In March, 2022, PCRWR was brought under the administrative control of Ministry of Water Resources through the decision of the Federal Cabinet. Ever since its inception, the organization has determined its research and development activities according to the mandate provided to it. Its research and development activities are either financed by Federal Government or by international donors as well as research agencies. The patronage from Government of Pakistan and knowledge support from international partners has resulted into the emergence of PCRWR as the most vibrant organization on water-related issues.

The Council is governed by a Board of Governors while Chairman, PCRWR is the Chief Executive. The Chairman is supported by the Secretary, Director Generals, Directors and other professionals. The total strength of the Council consists over 500 employees including; specialized staff (engineers, scientists, technicians, sub-engineers), administrative and management staff (administration, finance, coordination).

Functions of PCRWR

PCRWR is committed to advancing water resource management through comprehensive research, policy development, and monitoring. By promoting innovative technologies and providing training, PCRWR empowers stakeholders while ensuring accessible data and fostering partnerships to enhance water conservation and quality across the country. Some of the core functions of PCRWR are;

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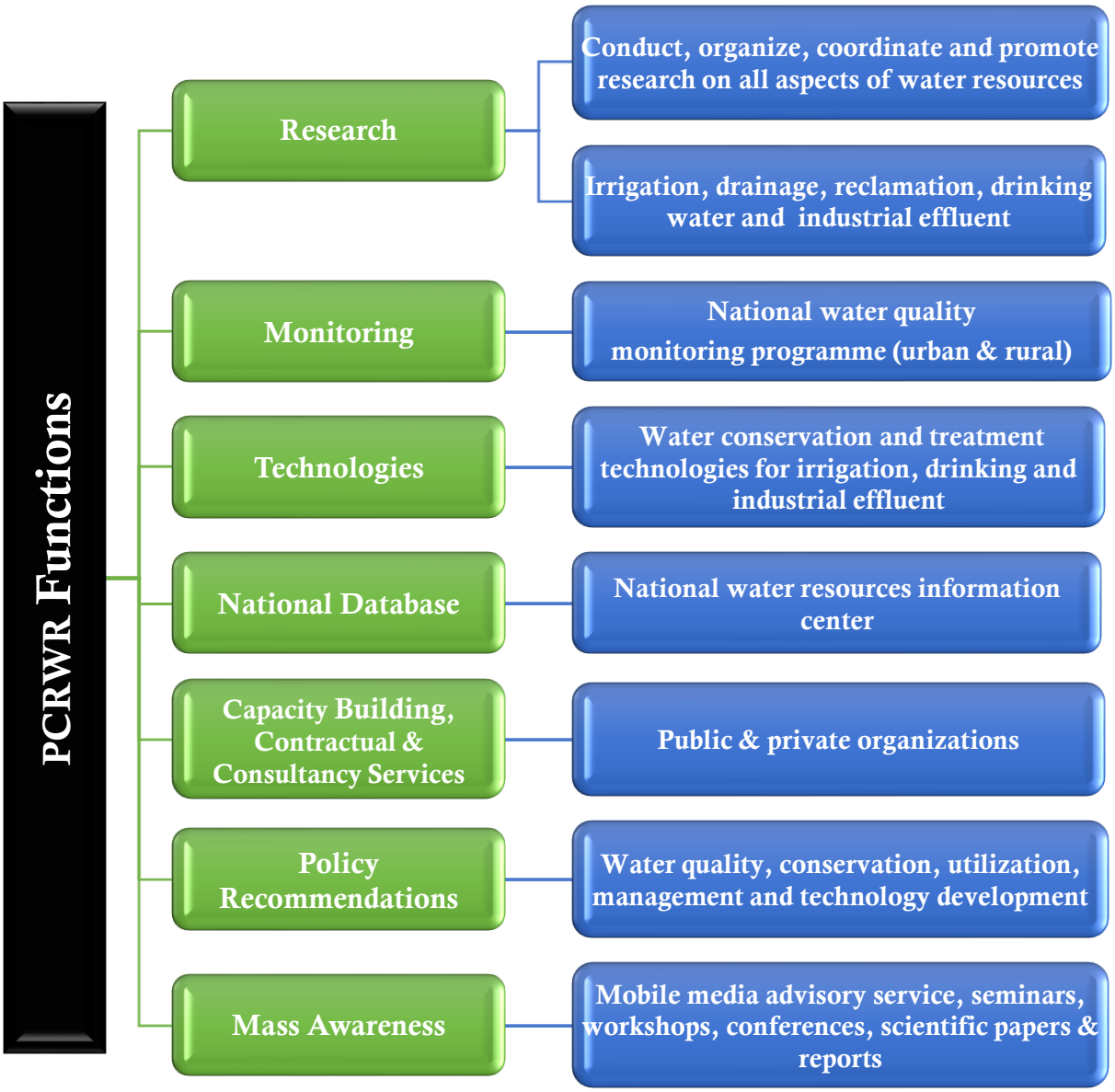


Research Establishments

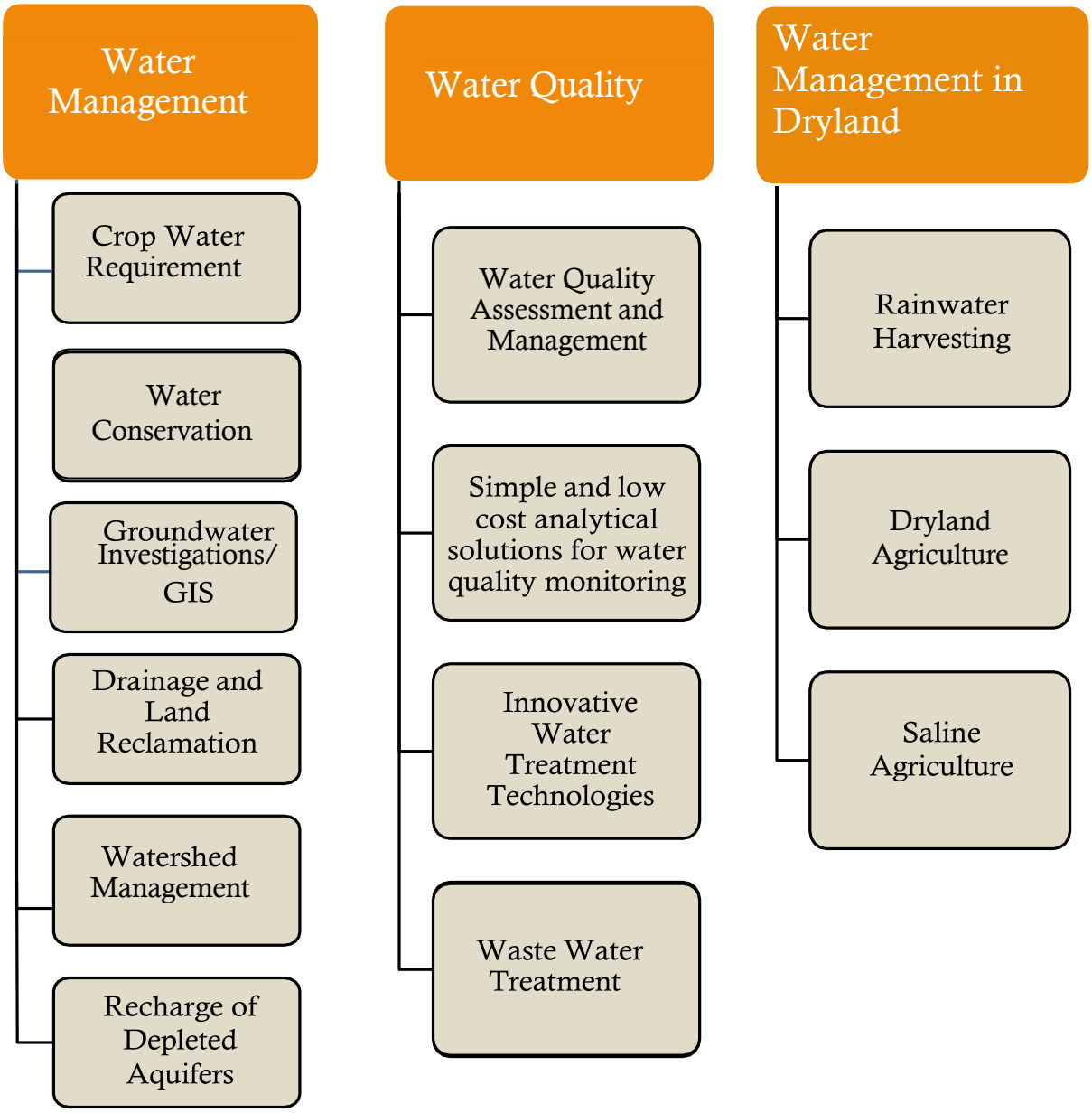
PCRWR has played its role, as a leading water sector research and development (R&D) organization through a well-established state of the art research and dissemination infrastructure:

- Headquarters in Islamabad with eight regional offices at Tandojam, Quetta, Bahawalpur, Lahore, Peshawar, Karachi, Muzafarabad and Gilgit
- Water testing laboratories in 24 cities including; Islamabad, Lahore, Bahawalpur, Tandojam, Quetta, Peshawar, Faisalabad, Gujranwala, Mianwali, Sahiwal, Sargodha, Sialkot, DG Khan, Multan, Badin, Hyderabad, Karachi, Nawabshah, Sukkur, Loralai, Abbottabad, DI Khan, Muzaffarabad and Gilgit
- National Capacity Building Institute (NCBI) Islamabad
- A network of seven research and demonstration stations in different agro-climatic zones of the country.
- GIS and Geo-hydrological laboratory, Islamabad
- Library Information and Documentation Centre, Islamabad
- Drainage type lysimeters located at Tandojam, Lahore, Quetta, and Peshawar to determine crop water requirements
- Soil Physics Laboratory, Islamabad

Major Research Areas

Mandate of PCRWR is broad in relation to the areas of different research in the country. However, the focused research areas are prioritized keeping in view the present resources and needs of the country.

PCRWR conducts its research keeping in view the needs of the country and in line with the Pakistan vision 2025, National Water Policy 2018, SDGs, PCRWR's research agenda and other related policies, such as Food Security Policy, Climate Change Policy, and Drinking Water Policy etc.



R&D Activities

Impact Assessment of Indus Waters Treaty on Command Areas of Eastern Rivers

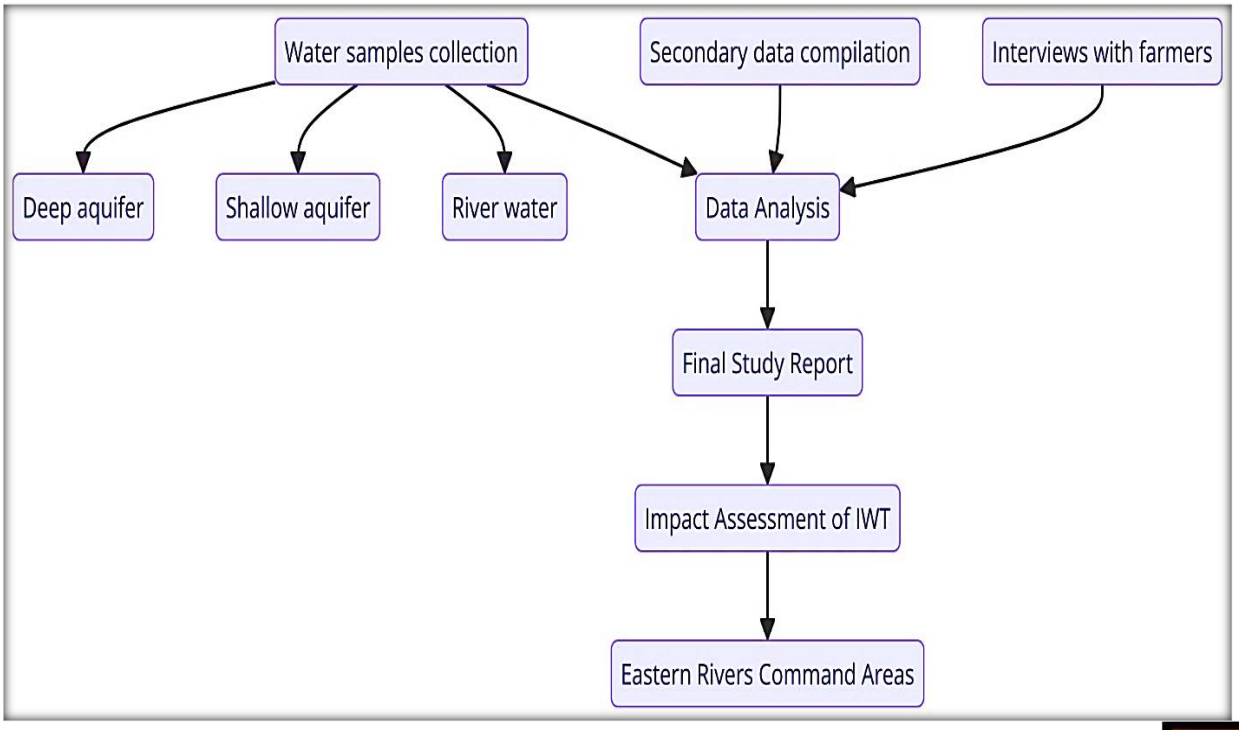
PCRWR is conducting a research project titled "Impact Assessment of Indus Waters Treaty on Command Areas of Eastern Rivers." The 1960 Indus Waters Treaty between India and Pakistan outlines water rights for the Indus River System. India's diversion of eastern river waters has affected Pakistan's resources, prompting the construction of link canals and reservoirs. Challenges such as excess floodwater from India, groundwater over-abstraction, and pollution from transboundary drains threaten water quality and ecosystems in Pakistan. The treaty allocates 33 MAF to India and 177 MAF to Pakistan, with India benefiting from western rivers for irrigation and power, while Pakistan faces limitations and climate change impact.

Objectives:

1. Assess the impacts of the Indus Waters Treaty (IWT) on the paths and beds of eastern rivers, flood plains, and the availability and quality of surface and groundwater resources in the command areas of eastern rivers in Pakistan.
2. Study the effects of the treaty on cultivated areas, cropping patterns, crop productivity, and the economic conditions of farmers.
3. Understand the impacts on the ecosystem, marine life, and flora/fauna in the study area.

Progress (2023-24):

Data collection for the impact assessment is underway. Interviews with farmers from various points along each river (head, middle, and tail) have been conducted to gather primary data. Secondary data from relevant departments is being compiled for analysis. Additionally, water samples from deep and shallow aquifers, as well as river water, have been collected and are being analyzed. This data will form the basis for assessing the IWT's impacts on the command areas of eastern rivers and will be detailed in the study's final report.



Real-Time Groundwater Monitoring and Advisory System for Chaj Doab

Groundwater faces challenges from over-abstraction, affecting both its quantity and quality. The National Water Policy (NWP) 2018 emphasizes the need for better monitoring, regulation, recharge promotion, and groundwater atlases. PCRWR has previously mapped groundwater in the Indus Plains and tested real-time monitoring with IWMI-Pakistan.

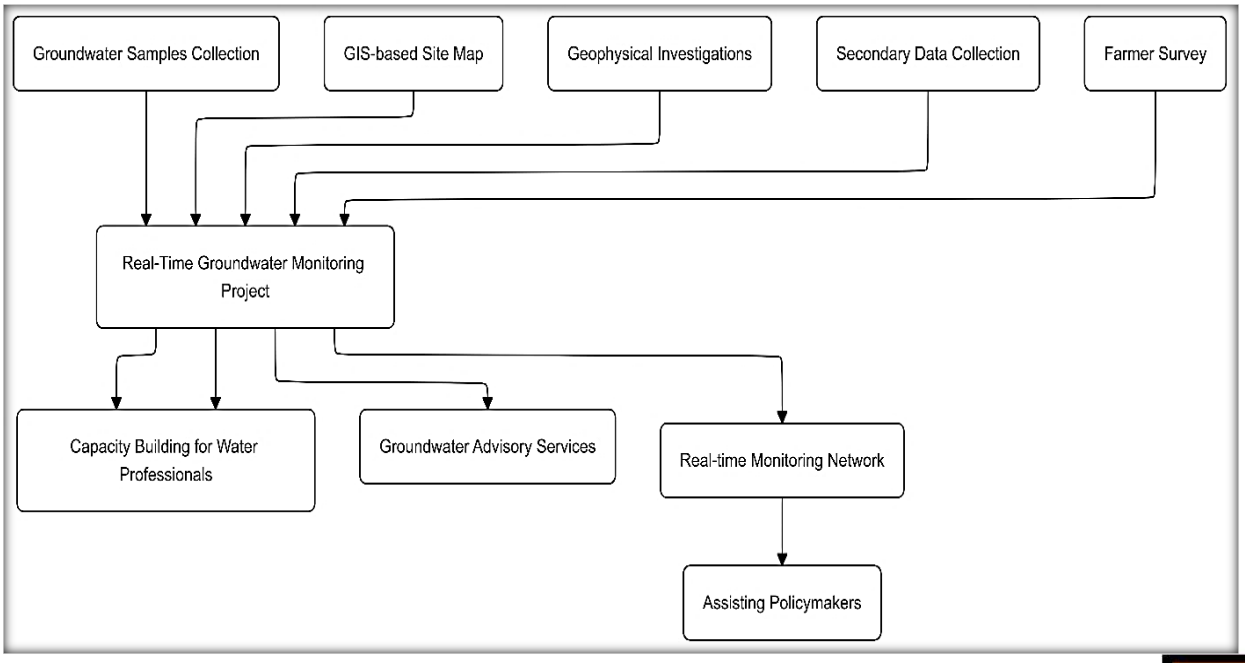
Chaj Doab, located between the Chenab and Jhelum rivers and spanning 14,000 km², experiences issues like water table depletion, quality deterioration, waterlogging, and salinity. Current manual and seasonal monitoring is insufficient. To address these challenges, PCRWR is conducting a research project titled "Real-Time Groundwater Monitoring and Advisory System for Chaj Doab," aiming to develop an advanced monitoring and advisory system for the region.

Objectives:

1. Develop a real-time groundwater monitoring network with wireless data transmission to track groundwater quality and levels.
2. Provide groundwater advisory services to farmers and groundwater managers, and estimate groundwater budgeting to assist policymakers in informed decision-making.
3. Enhance the capacity of water professionals in groundwater monitoring and sustainable management through technology transfer.

Progress (2023-24):

- Conducted a reconnaissance survey to assess the hydrological characteristics of Chaj Doab.
- Prepared a GIS-based map for site identification and installed MLOW/CTDs.
- Performed geophysical investigations for site evaluations.
- Collected secondary data on water table depth and conducted a farmer survey for hydrological information.
- Gathered groundwater samples for physio-chemical and isotopic analysis.



Assessment of Transboundary Pollution in Eastern Rivers

PCRWR has conducted the Assessment of Transboundary Pollution in Eastern Rivers (Ravi and Sutlej) & Associated Drains from October 2023 to April 2024. This study monitors transboundary pollution in the Ravi and Sutlej rivers and their associated drains to inform effective water management at local, national, and transboundary levels.

Key Activities:

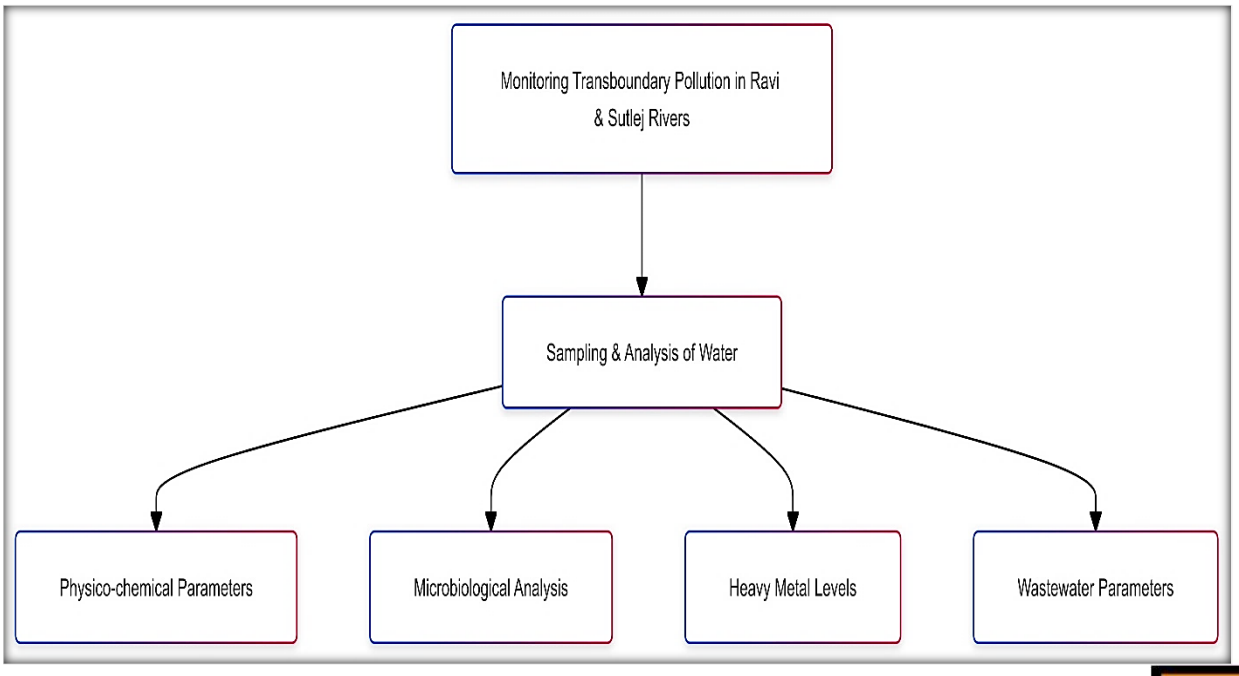
- **Sampling and Analysis:** Water samples were collected and analysed for physico-chemical, microbiological, heavy metal, and wastewater parameters. Results were compared against drinking water, irrigation, aquatic life, and recreational standards from Pakistan, India, and international guidelines.

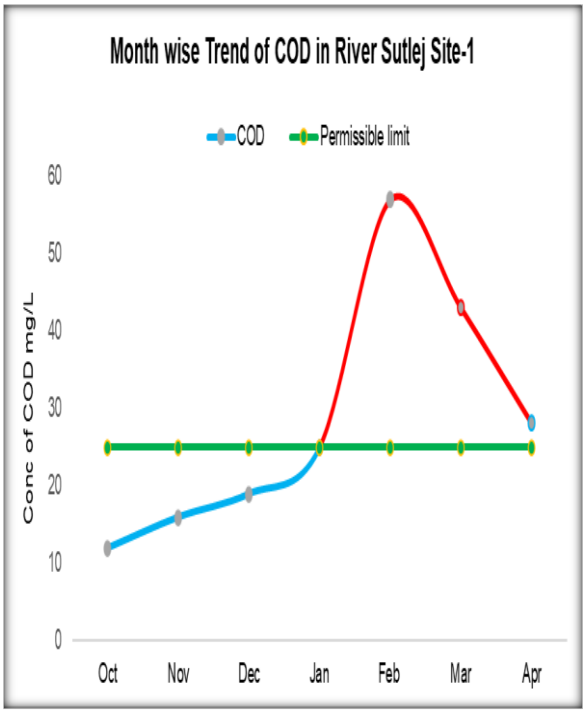
- **Pollution Assessment:** Monitoring results from October 2023 to April 2024 identified several parameters—Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Total Suspended Solids (TSS), Total Phosphate, Total Nitrogen, and heavy metals—exceeding permissible limits in both the Sutlej and Ravi rivers.

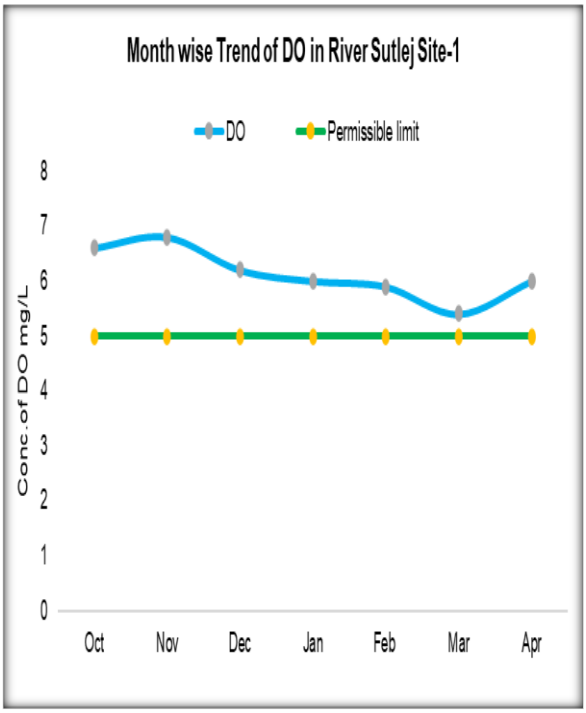
- **Site-Specific Findings:** Significant pollution was detected in the Ravi River at Gavota Ujh River and Gavota Ravi River, indicating transboundary pollution. The Sutlej River showed minimal chemical or biological pollution but did have heavy metal contamination.

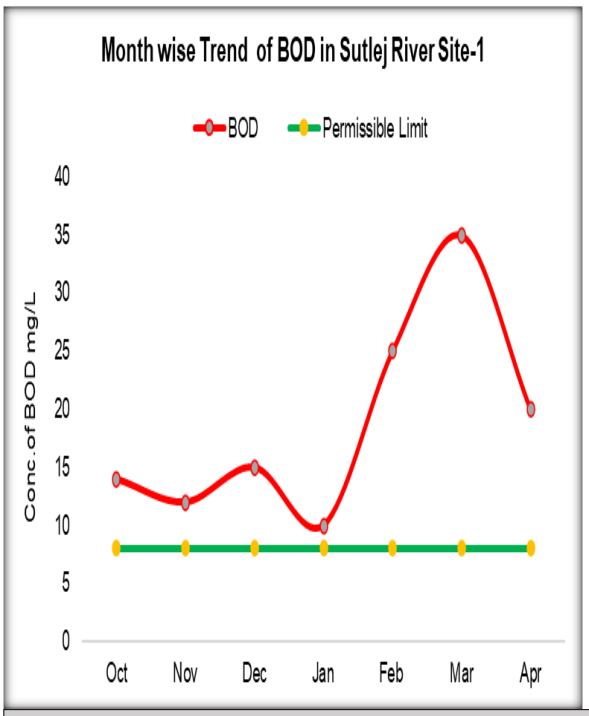
- **Drain Analysis:** The Fazlika Drain, Kasur Nallah, and Hudiara Drain exhibited high pollution levels upon entering Pakistan, with wastewater parameters exceeding National Environmental Quality Standards (NEQS).

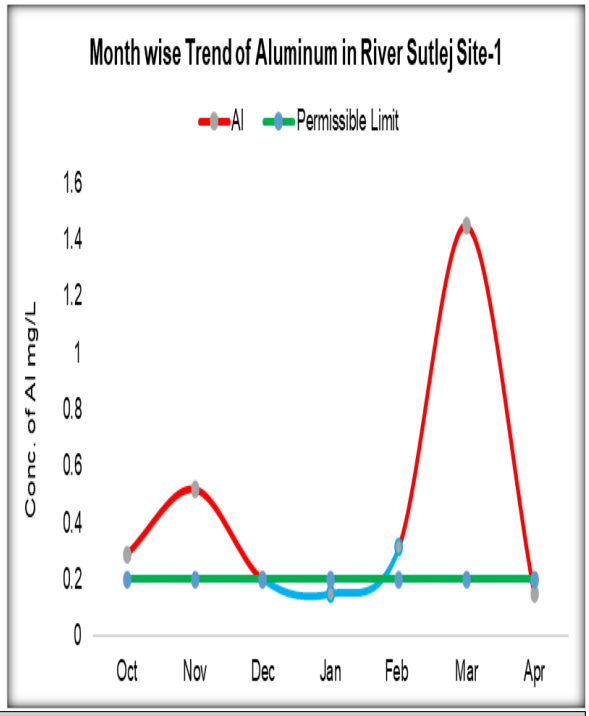
  The study highlighted the critical pollution issues and emphasizes the need for enhanced transboundary cooperation to address water quality challenges.











Graphical representation of month wise trend of potential contaminants in River Sutlej Site-1

Monitoring Sea Water Intrusion, Sea Level Rise, Coastal Erosion & Land Subsidence along Sindh and Balochistan Coast

In collaboration with the National Institute of Oceanography (NIO) and funded by the Government of Pakistan (GoP), Pakistan Council of Research in Water Resources (PCRWR) initiated a five-year project to address critical coastal challenges. The project focuses on monitoring sea water intrusion, sea level rise, coastal erosion, and land subsidence along the Sindh and Balochistan coasts. A key objective is to establish a network of Multi-Level Observation Wells (MLOWs) to monitor groundwater levels and salinity changes in these vulnerable areas.

Objectives

- Establish a network of MLOWs for continuous monitoring of groundwater levels and salinity fluctuations.
- Provide data-driven insights for effective coastal management and mitigation of sea water intrusion.
- Conduct quarterly water quality and resistivity surveys to assess long-term coastal sustainability.

Progress (2023-2024)

During 2023-2024, significant progress was made in monitoring and managing sea water intrusion along the Sindh and Balochistan coasts. PCRWR Karachi office monitored 141 Multi-Level Observation Wells (MLOWs) quarterly for groundwater levels and quality, collecting 1,901 water samples for comprehensive physico-chemical analysis. Additionally, 20 MLOWs were repaired, and four new ones were installed to ensure continuous data collection. Electrical Resistivity Survey (ERS) was conducted on a 10 km x 10 km grid across key districts, completing 202 out of 291 planned points to map groundwater salinity. These efforts provide critical data to address the impacts of sea water intrusion, coastal erosion, and rising sea levels.

Time Period	Water SamplesCollected	Remarks
July – September 2023	476	Analyzed for Cations & Anions
October- December 2023	461	
January – March 2024	481	
April – June 2024	483	
Total	**1901**	

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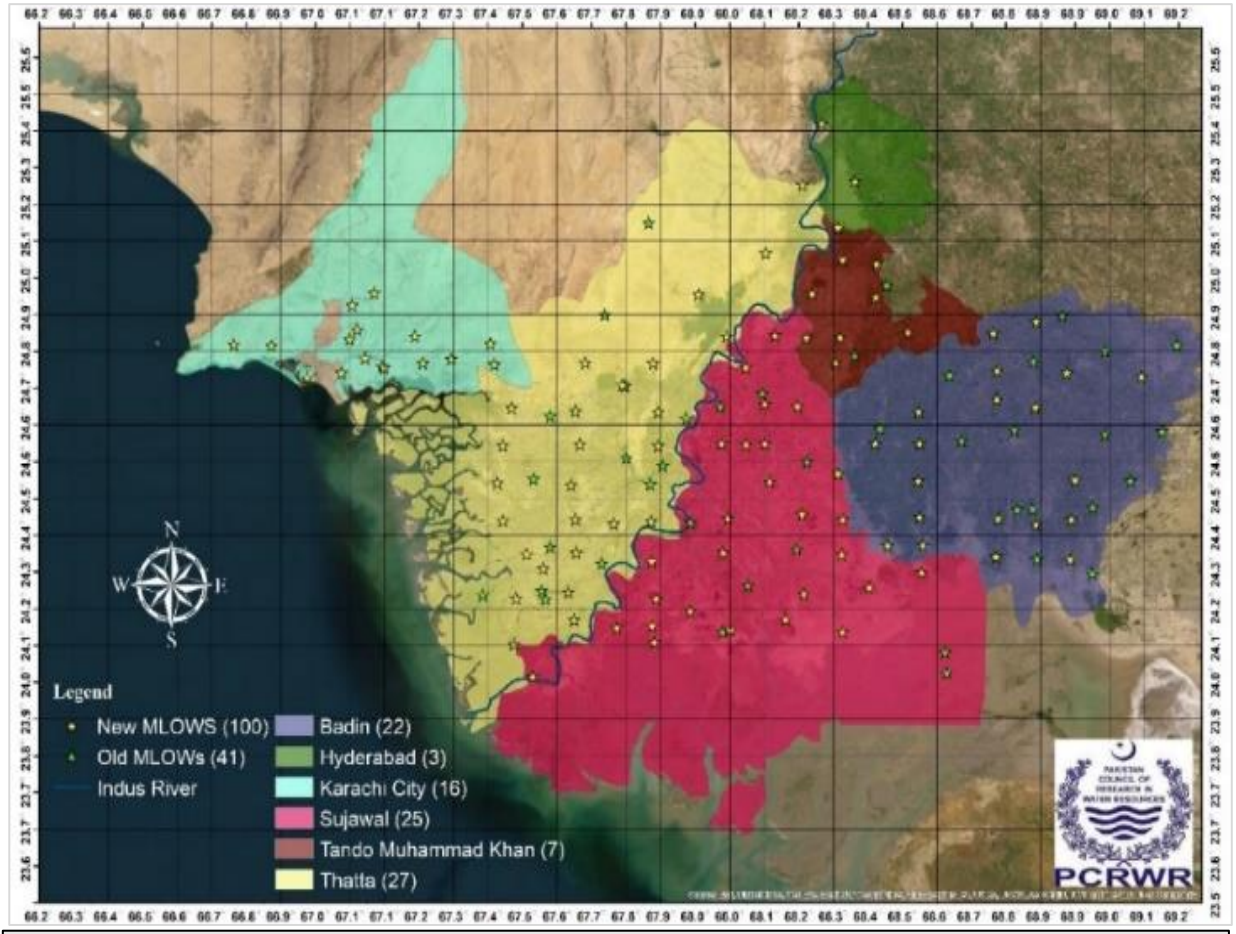
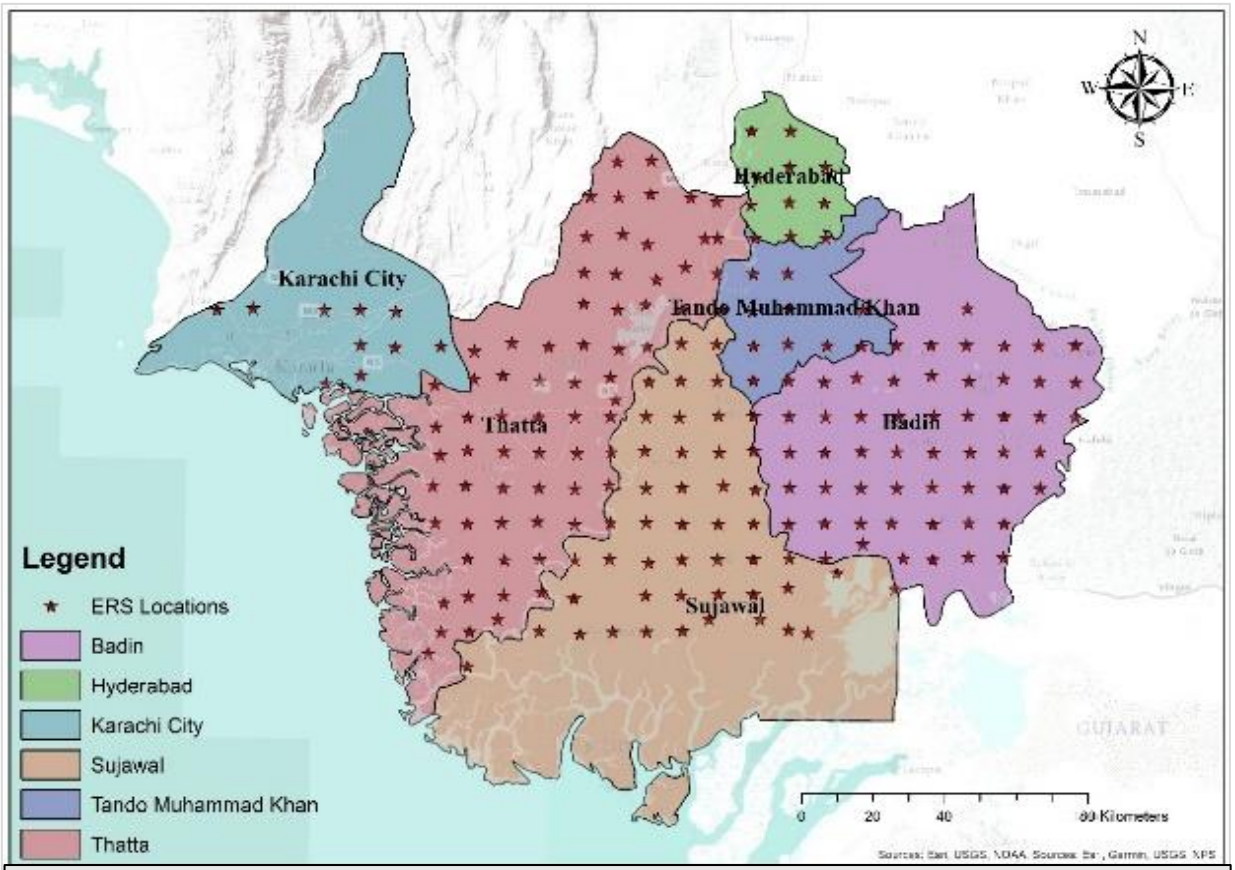


Map showing the installation of MLOWs along River Indus



ERS Survey Location & Grid Map under Sea Water Intrusion Project

Environmental Flow Assessment of Critical Sites on the Ravi River

PCRWR conducted an environmental flow (E-flow) study from Ravi Siphon to Head Balloki, covering a 100 km stretch of the river. The assessment focused on critical parameters such as fish populations, macro-invertebrates, wildlife, riparian vegetation, discharge, and water quality across four key sites.

Key Findings:

1. **Ravi Siphon**: This site serves as a reference with medium pollution levels. It supports a diverse aquatic fauna and flora, indicating relatively better water quality.

2. **Shahdara Bridge**: The area is heavily polluted due to nearby discharge from Shahdara drain/pumping station. Dissolved Oxygen levels are critically low at 1 mg/L, and no aquatic life was observed, only scavenger birds.

3. **Manga Mandi**: This site is heavily polluted, particularly by the Hudiara drain. The absence of fish and other aquatic life highlights severe pollution issues.

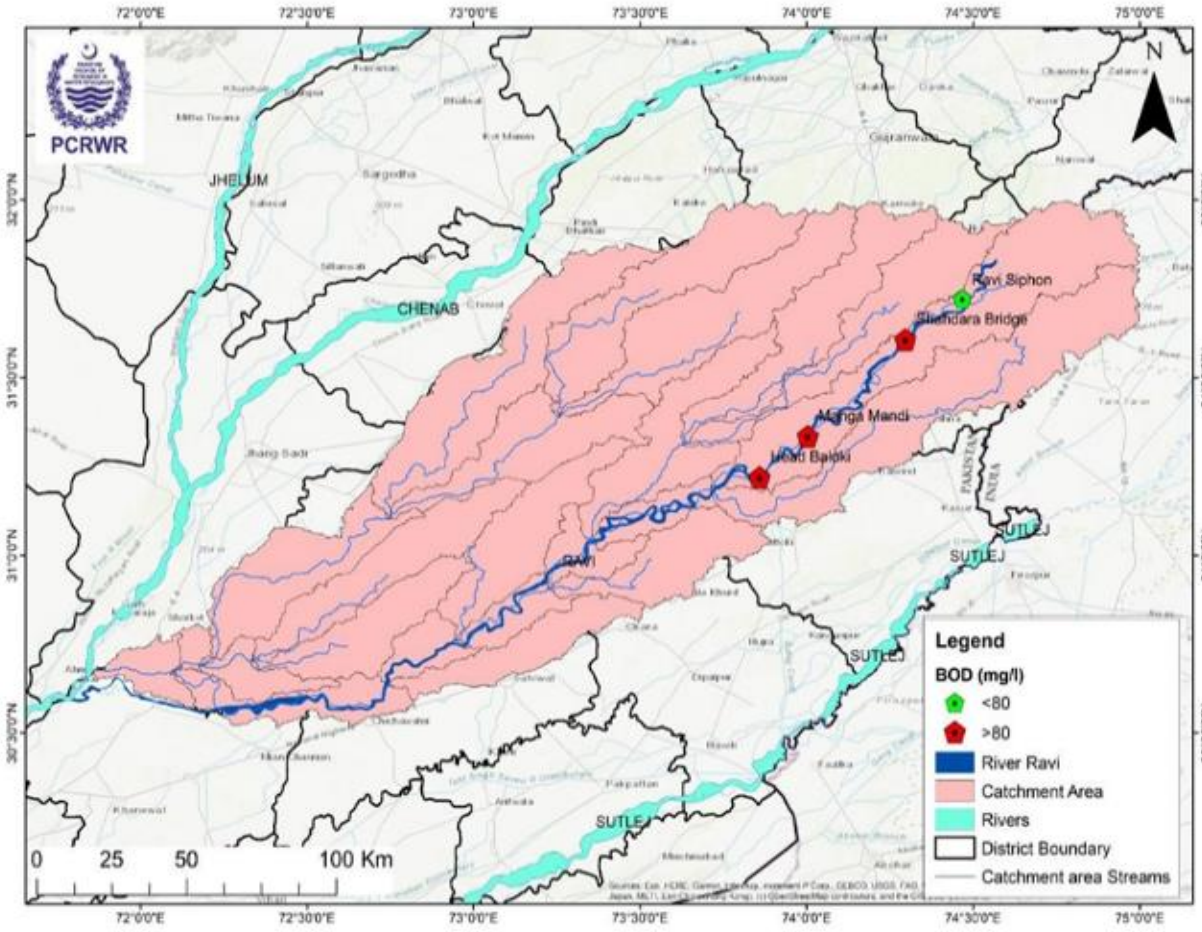
4. **Head Balloki**: Despite being the downstream terminus for upstream pollution, this site shows moderate pollution levels. The presence of water from the UCC and Qadirabad Balloki Link Canal has diluted the pollution to some extent.

Riparian Vegetation and Wildlife Observations:

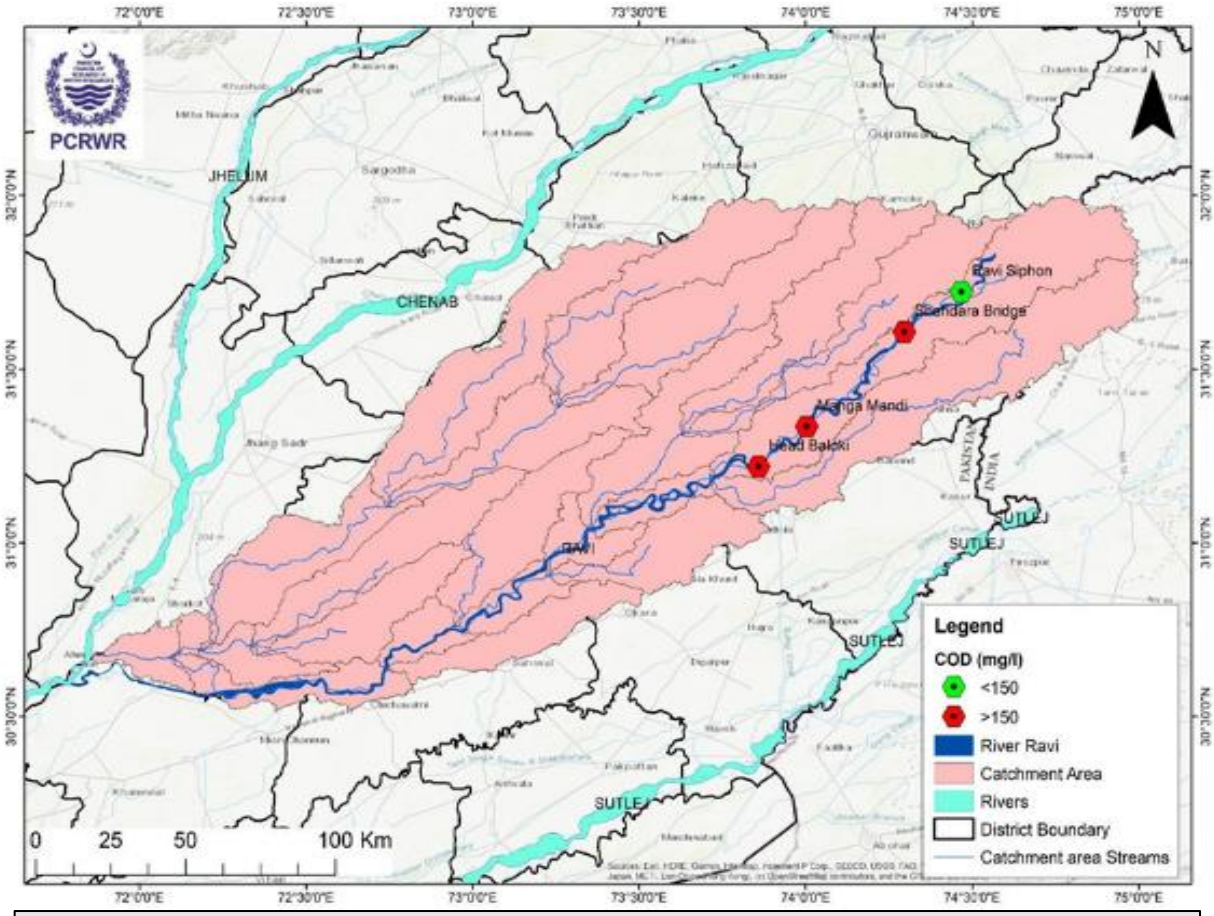
- **Riparian Vegetation**: At Head Balloki, Eichhornia crassipes (water hyacinth) indicates moderate pollution. Alternanthera paronychioides and xerophylloides, found at Shahdara and Manga Mandi, suggest high pollution levels. Polygonum glabratum, observed at Ravi Siphon, is beneficial for wildlife and erosion control.

- **Wildlife**: A total of 28 species of water-dependent birds were recorded. Ravi Siphon had the highest diversity with 15 water-dependent birds, 19 terrestrial birds, 6 wild mammals, and 1 monitor lizard. Shahdara had fewer species with an increase in scavenger birds. Manga Mandi saw reduced wildlife presence, while Head Balloki maintained a relatively healthy habitat with 14 water-dependent birds, 7 terrestrial birds, and 6 wild mammals.

The study concludes that there is a critical need for improved E-flow management, especially from Shahdara Bridge to Manga Mandi, to address pollution and support the river's ecological health, particularly during dry seasons. Future studies will further evaluate E-flow requirements at these critical sites



Pollution Load identification in River Ravi selected sites in term of BOD



Pollution Load identification in River Ravi selected sites in term of COD

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Mapping of Water Resources in Islamabad

Islamabad faces increasing water demand as a rapidly growing city. A comprehensive mapping study of water resources was conducted to understand water availability, manage water effectively, identify vulnerable areas, conserve the environment, and plan for climate change impacts. The initial mapping was done in January 2024, followed by another assessment in June 2024 under extreme climate conditions, including heat waves. The study focused on streams, dams, and tube wells, assessing both urban and rural water sources, including filtration plants and water supply schemes.

Objective

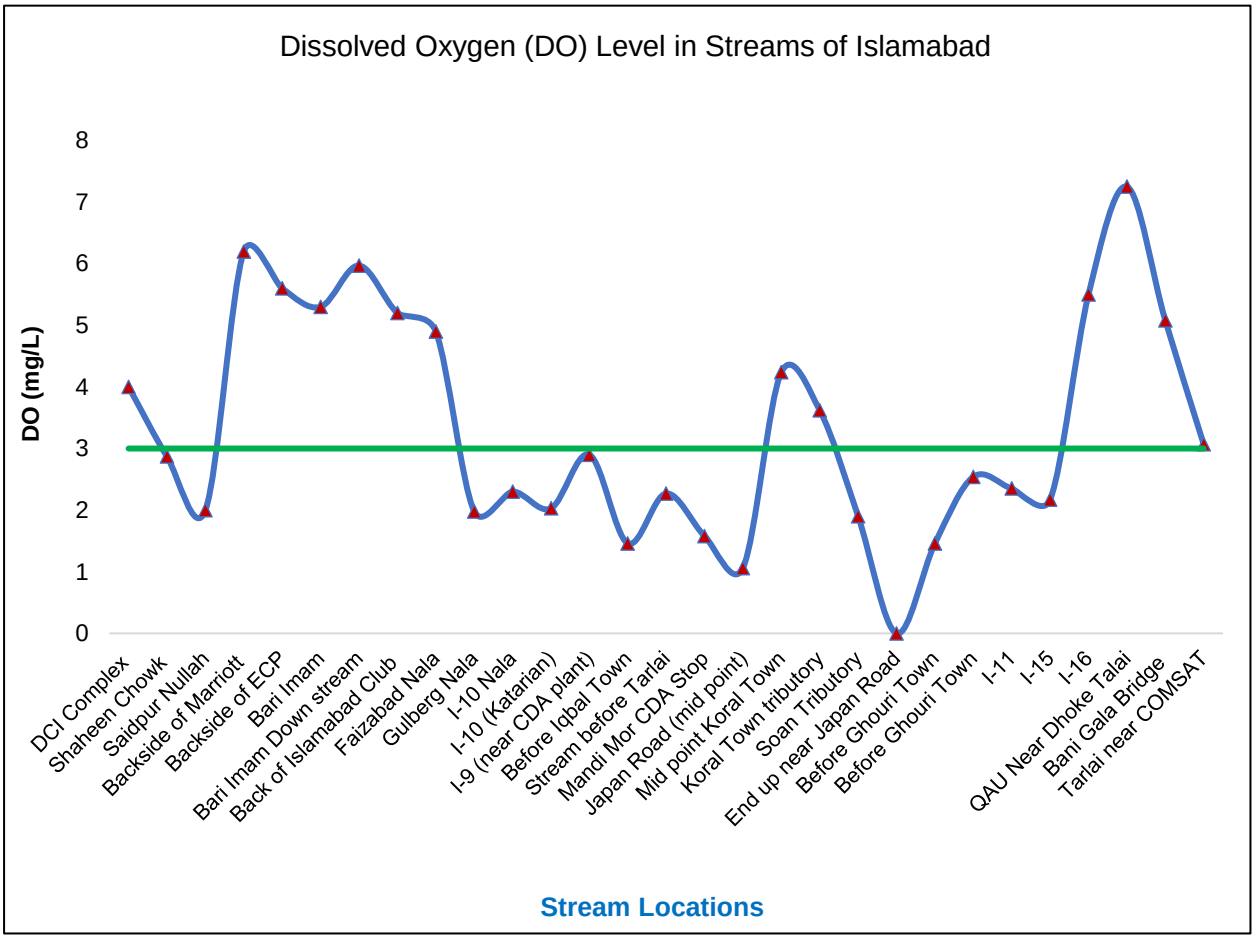
The primary objective was to map and assess water resources in Islamabad to understand their availability, distribution, and impact on aquatic ecosystems. The study aimed to develop strategies for water management and environmental conservation in the face of climate variability.

Key Activities

1. **Discharge Flow Measurement:** Flow in 26 stream sites was measured using non-contact radar technology. The highest flow rate in January 2024 was observed at streams passing through Gulberg (1959 lps), while the lowest was recorded behind the Marriott Hotel in F-6 (28 lps). In June 2024, flow rates increased, with a maximum of 2424 lps in Gulberg streams and a minimum of 55 lps at the I-15 stream terminal point.
2. **Water Quality Assessment of Streams:** Samples were collected from 31 streams and tributaries for testing physico-chemical, heavy metals, wastewater, and microbiological parameters. 77% of streams showed Dissolved Oxygen (DO) levels below 3 mg/L, indicating hypoxic conditions, with the lowest DO level recorded at Niki Lai Terminal point, Mandi Morr (2.0 mg/L). 52% of streams had high Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD) levels, pointing to poor wastewater treatment. Total Nitrogen, Oil and Grease, and Total Suspended Solids (TSS) also exceeded permissible limits in 19% of samples.
3. **Water Quality Assessment of Drinking Water Sources:** A total of 288 water sources were monitored, including 127 tube wells, 108 filtration plants, 41 rural water supply schemes, and 12 waterworks. Of these, 66% were found to provide safe drinking water, while 34% were unsafe due to microbial contamination, turbidity, and nitrate levels. Unsafe sources included 36% of filtration plants, 17% of tube wells, 80% of rural water supply schemes, and 42% of waterworks.
4. **Groundwater Potential Investigation:** Depth to Water Table (DTW) measurements were taken from 309 groundwater sources in 2023 using a grid system (1 km x 1 km in urban areas and 2 km x 2 km in rural areas). Geophysical surveys were conducted at 350 sites to map groundwater potential at depths of 50 m, 100 m, 150 m, and 300 m.
5. **Digital Terrain Model (DTM) and Mapping:** A 3D Digital Terrain Model (DTM) was developed, representing terrain and water resource distribution to enhance the understanding of groundwater potential and surface water dynamics in Islamabad.

Recommendations

The study recommends establishing a coordinated water quality monitoring and pollution control system for the ICT area, enforcing water and environmental legislation, and adopting demand-side water management approaches. The Islamabad Water Act, developed in collaboration with PCRWR and partner agencies, should be finalized and enforced.


Dissolved Oxygen (DO) Level in Streams of Islamabad
DO (mg/L)
0
1
2
3
4
5
6
7
8
DCI Complex
Shaheen Chowk
Saidpur Nullah
Backside of Marriott
Backside of ECP
Bari Imam
Bari Imam Down stream
Back of Islamabad Club
Faizabad Nala
Gulberg Nala
I-10 Nala
I-10 (Katarian)
I-9 (near CDA plant)
Before Iqbal Town
Stream before Tarlai
Mandi Mor CDA Stop
Japan Road (mid point)
Mid point Koral Town
Koral Town tributory
Soan Tributory
End up near Japan Road
Before Ghouri Town
Before Ghouri Town
I-11
I-15
I-16
QAU Near Dhoke Talai
Bani Gala Bridge
Tarlai near COMSAT
Stream Locations

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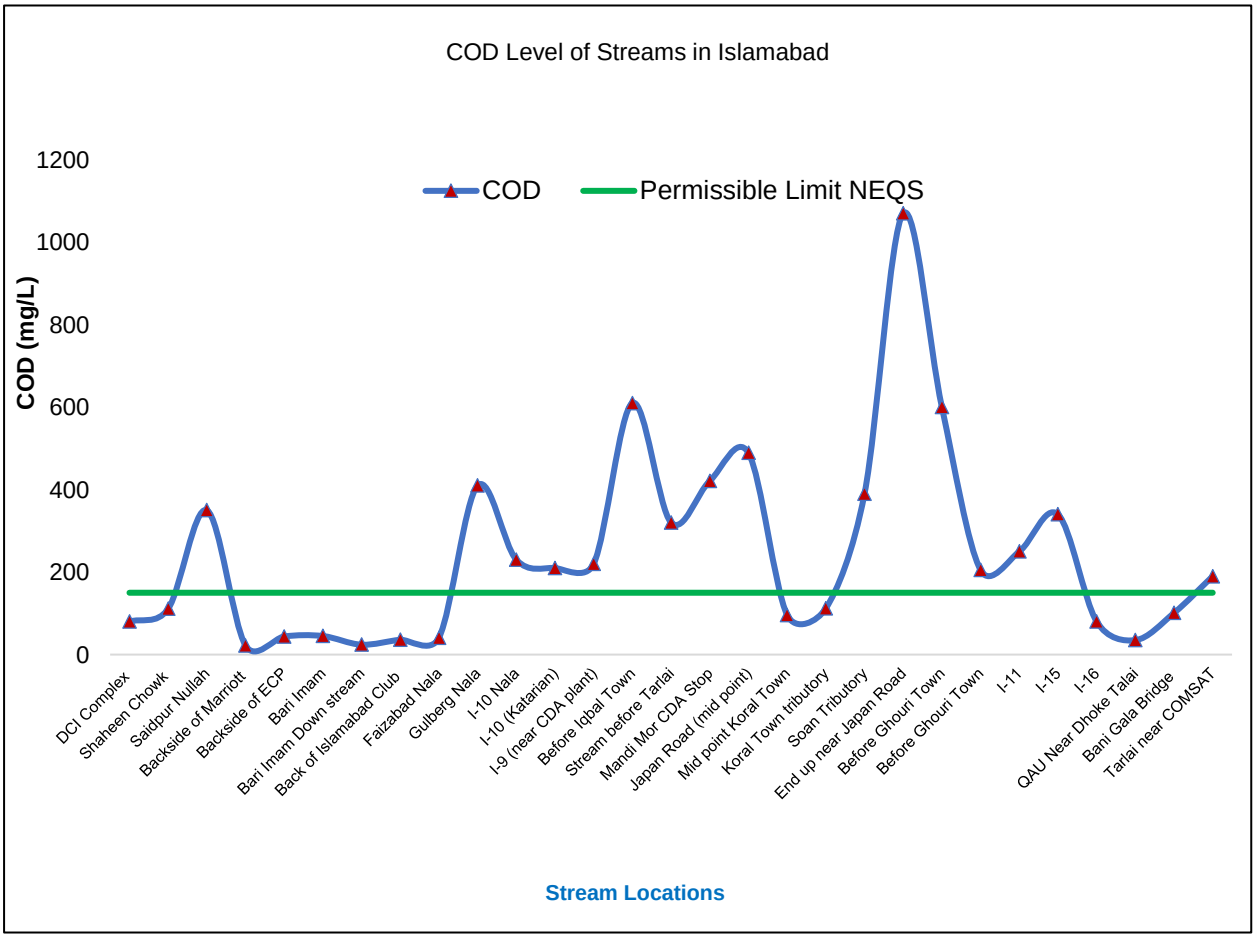

COD Level of Streams in Islamabad
COD
Permissible Limit NEQS
COD (mg/L)
0
200
400
600
800
1000
1200
DCI Complex
Shaheen Chowk
Saidpur Nullah
Backside of Marriott
Backside of ECP
Bari Imam
Bari Imam Down stream
Back of Islamabad Club
Faizabad Nala
Gulberg Nala
I-10 Nala
I-10 (Katarian)
I-9 (near CDA plant)
Before Iqbal Town
Stream before Tarlai
Mandi Mor CDA Stop
Japan Road (mid point)
Mid point Koral Town
Koral Town tributory
Soan Tributory
End up near Japan Road
Before Ghouri Town
Before Ghouri Town
I-11
I-15
I-16
QAU Near Dhoke Talai
Bani Gala Bridge
Tarlai near COMSAT
Stream Locations

Joint Discharge Measurement on Indus River- Technical Support to IRSA

The Indus River System Authority (IRSA) designated Pakistan Council of Research in Water Resources (PCRWR) as a neutral expert to conduct joint discharge measurements. These measurements were carried out from May 15 to May 21, 2024, at key locations including downstream of the Taunsa Barrage, Chachran Bridge, and Guddu Barrage. Using advanced technology such as the Acoustic Doppler Current Profiler (ADCP), PCRWR led this effort under the supervision of an IRSA-appointed committee. The primary objective was to assess the pre-monsoon flow conditions in the Indus River.

To ensure accuracy and transparency, PCRWR conducted a thorough reconnaissance survey to select appropriate sites for discharge measurements. The actual discharge measurements were taken in the presence of all relevant stakeholders, including the Punjab Irrigation Department (PID), Sindh Irrigation Department (SID), and Balochistan Irrigation Department (BID). This collaborative approach, overseen by the designated committee, aimed to bridge trust gaps between stakeholders by utilizing PCRWR's expertise and state-of-the-art technology.

Determination of Water Requirements of Sugarcane under Different Water table Depths

PCRWR is conducting research to determine the water requirements of sugarcane under varying water table depths. By evaluating water needs, groundwater contribution, crop coefficient, yield, and water productivity, this study aims to optimize water use and improve agricultural outcomes in different conditions.

Achievements

During the study, sugarcane was cultivated under three different water table conditions:

- **1.75 m Water Table Depth (WTD):**
  - Evapotranspiration (ET): 1948 mm
  - Groundwater Contribution (S): 281 mm
  - Yield: 117 tons per hectare
  - Water Use Efficiency (WUE): 6.00 kg/m³
- **2.00 m Water Table Depth (WTD):**
  - Evapotranspiration (ET): 1916 mm
  - Groundwater Contribution (S): 163 mm
  - Yield: 136 tons per hectare
  - Water Use Efficiency (WUE): 6.99 kg/m³
- **Free Drainage:**
  - Evapotranspiration (ET): 1864 mm
  - Groundwater Contribution (S): 0 mm
  - Yield: 123 tons per hectare
  - Water Use Efficiency (WUE): 6.58 kg/m³

Initial Findings

- The highest yield and water use efficiency were observed at a 2.0 m water table depth.
- Groundwater contribution is a crucial component of water balance, indicating potential for reducing surface water usage in the Lower Indus Basin.

These findings contribute to a better understanding of water requirements for sugarcane, offering insights into effective irrigation practices and enhancing crop productivity

Evaluation of Water Productivity of Rice-Wheat on Raised Bed at R&D Farm Sialmore

PCRWR is advancing efficient irrigation techniques, such as bed and furrow irrigation, through regular studies. These methods reduce water wastage, minimize pollution from fertilizers and pesticides, and support higher cropping intensity while managing salt-affected soils. PCRWR's research aims to optimize these techniques, enhancing water use efficiency and contributing to sustainable agriculture in Pakistan.

Objectives

- Assess the water conservation potential of raised bed planting compared to conventional flood irrigation.
- Evaluate the cost-effectiveness of bed planting versus traditional irrigation methods.

Achievements

Rice (Kharif 2023)

- **Raised Beds**: Required 2872 mm of water with 43 irrigations.
- **Direct Seeded Rice (DSR - Flat)**: Needed 2158 mm of water with 55 irrigations.
- **Conventional Method**: Used 2624 mm of water with 36 irrigations.

Farmers traditionally used between 2786 and 3374 mm of water with 35 to 40 irrigations.

Wheat (Rabi 2023-24)

- **On Bed**: 360 mm of water with a yield of 2936 kg/ha.
- **On Ridges**: 368 mm of water with a yield of 3500 kg/ha.
- **Broad Cast Method**: 378 mm of water with a yield of 4065 kg/ha.
- **Zero Tillage**: 560 mm of water with a yield of 4600 kg/ha.

This research demonstrates significant water savings and yield benefits with alternative irrigation methods, emphasizing the effectiveness of raised bed planting and other water conservation techniques.

Water Requirement of Sugarcane in Central Punjab

PCRWR is conducting a study to optimize water use for the 77400 variety of sugarcane. By assessing crop yield, height, and water use efficiency (WUE) under controlled conditions, this research aims to provide valuable insights for improving water management and enhancing agricultural productivity.

Achievements

In the 2023-24 season, sugarcane was grown at the lysimeter station in Lahore. Key findings include:

- **Water Applied**: 113 cm
- **Rainfall**: 96 cm
- **Consumptive Use**: 144 cm
- **Crop Coefficient (Kc)**: 0.86
- **Yield**: 70.5 tons per hectare
- **Water Use Efficiency (WUE)**: 292 kg per cubic meter

This data helps in understanding how much water is required for optimal sugarcane growth, guiding better irrigation practices and enhancing crop productivity

Cultivation of Various Sugarcane Varieties under Different Irrigation Methods

PCRWR is conducting research to optimize the cultivation of various sugarcane varieties under different irrigation methods, including ring-pit, raised bed, and ridge irrigation. By assessing yield, agronomic parameters, water productivity, soil salinity, water saving, and economic viability, this study aims to enhance water management and improve agricultural outcomes.

Objective:

- To determine the yield, agronomic parameters and water productivity of sugarcane varieties grown on ring-pit, raised bed and ridge irrigation
- To assess the soil salinity behavior, water saving and economic viability of sugarcane varieties grown on ring-pit, raised bed and ridge irrigation

Achievements

The study examined sugarcane varieties—CPD-251, NIA-2012, and Thatta-10—under three irrigation methods:

Yield and Yield Parameters	Ring-Pit			Raised Bed			Ridges		
	CPD-251	NIA-2012	Thatta-10	CPD-251	NIA-2012	Thatta-10	CPD-251	NIA-2012	Thatta-10
Water Applied (mm)	903			1247			1597		
Rainfall (mm)	423								
Effective rainfall (mm)	231								
Total water used (mm)	1134			1477			1827		
Yield (Ton/ha)	86	102	84	111	127	88	120	111	77
WUE (kg/m^3)	7.58	8.99	7.41	7.52	8.6	5.96	6.57	6.08	4.21

Initial Findings

The highest yield and water use efficiency were observed with the raised bed irrigation method, particularly for the NIA-2012 variety. Ring-pit irrigation also demonstrated high water use efficiency, indicating potential for water savings. These findings offer valuable insights into effective irrigation practices for different sugarcane varieties, guiding better water management and enhancing crop productivity.

Development of Demonstration Sites for Groundwater Recharge in Balochistan

Pakistan Council of Research in Water Resources (PCRWR), in collaboration with UNICEF Pakistan, initiated a project to pilot groundwater recharge interventions from June 2023 to November 2023, in response to the critical issue of groundwater over-extraction in Balochistan, driven by rising water demand and excessive tube well installations. Groundwater levels in Balochistan have been depleting at alarming rates, with declines of up to 5 meters annually in some regions. This project focused on balancing groundwater abstraction with natural recharge to promote sustainable water management.

Objectives:

- Demonstrate and promote nature-based solutions for groundwater recharge.
- Build climate resilience against floods and droughts.

Interventions:

The project implemented several interventions across four districts: Quetta, Pishin, Loralai, and Kalat. Based on detailed investigations, the following interventions were executed:

1. **BUITEMS, Quetta**: Rooftop rainwater harvesting with storage tanks and a recharge well for surface runoff.
2. **Bostan, Pishin**: Leaky dam, check structures, and ditches/ponds with inverted wells.
3. **University of Loralai, Loralai**: Check structures and ditches/ponds with inverted wells.
4. **Zawai, Kalat**: Reservoir, check dam, check structures, and inverted well.

Impact Assessment:

- **Bostan Site**: Anticipated annual groundwater recharge of approximately 6.0 million gallons.
- **BUITEMS Site**: Anticipated recharge of 0.63 million gallons annually, out of 2.01 million gallons of potential runoff.
- **University of Loralai Site**: Expected annual recharge of 6.57 million gallons, out of 17.0 million gallons of runoff.

Piezometers have been installed at each site to monitor groundwater levels, and the actual impact of these recharge interventions will be evaluated during the rainy season. This project is a critical step in addressing groundwater depletion and building climate resilience in Balochistan.

Water Quality Monitoring in Karachi: Cholera & Naegleria Fowleri Outbreak Response

Karachi has been facing water-borne diseases, including cholera, primarily due to the supply of contaminated and non-chlorinated water. With rising cholera cases during emergencies, PCRWR, in collaboration with UNICEF, initiated a project to monitor water quality and mitigate bacterial contamination in tap water. The study aimed to detect harmful bacteria like *Vibrio cholerae*, *E. coli*, and total coliforms in household water, and reduce contamination through chlorination. The effectiveness of chlorination was assessed by testing water samples for free residual chlorine and bacterial presence at both the source and consumer end.

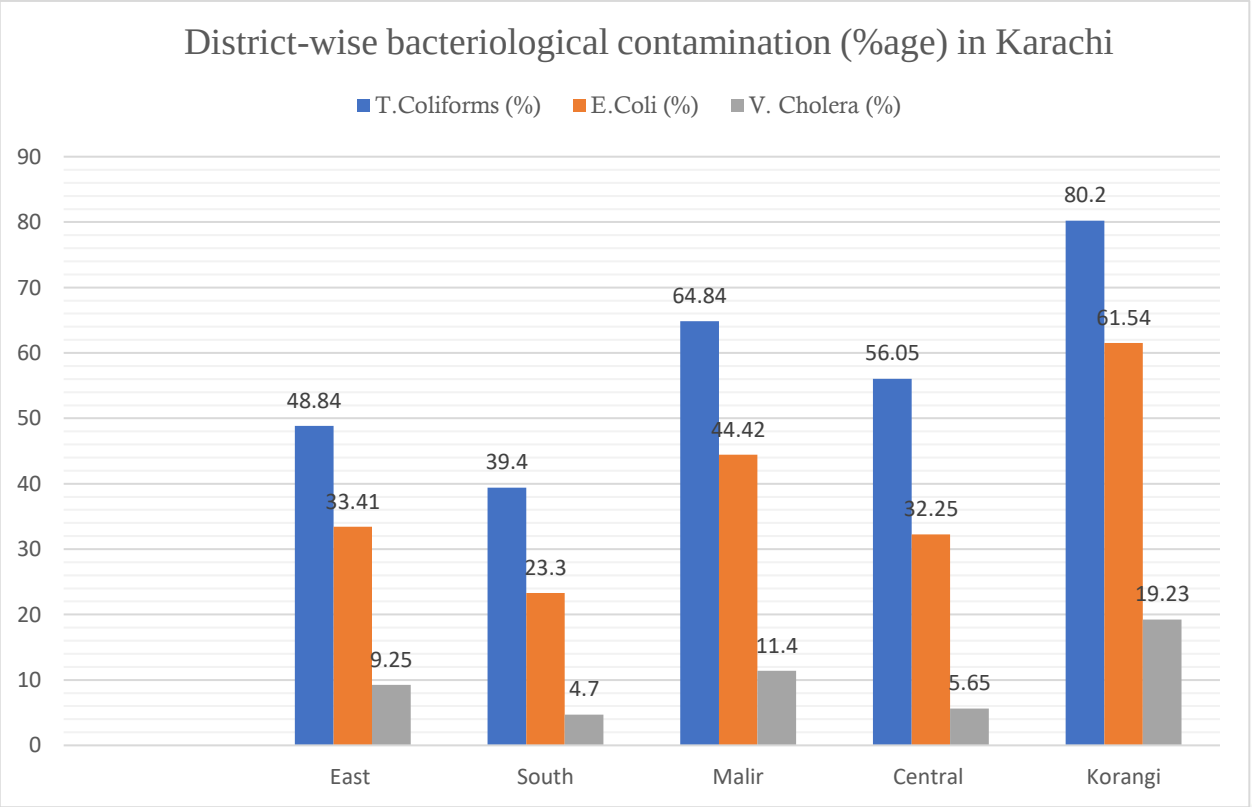
Objectives

- Monitor and test water quality to identify contaminated hotspot areas in Karachi.
- Implement secondary chlorination at 15 water pumping stations to control bacterial contamination and prevent outbreaks.

Progress

PCRWR monitored water quality across Karachi, analyzing 1,476 water samples for parameters including electric conductivity, pH, turbidity, and bacteria such as *Vibrio cholerae* and *E. coli*. Results showed 10% of samples tested positive for *Vibrio cholerae*, 38% were contaminated with *E. coli*, and 57% contained total coliforms.

To combat the risk of a cholera outbreak, secondary chlorination using sodium hypochlorite was introduced at 17 locations, including 16 pumping stations and one reservoir. This process treated approximately 158 MGD of water, serving an estimated 4.51 million people with safe drinking water. Post-chlorination monitoring revealed a significant reduction in bacterial contamination, with *Vibrio cholerae* cases dropping to less than 5% and a decrease in fecal contamination at consumer ends. This project continues to provide vital insights into managing water quality and preventing water-borne diseases in Karachi.



Water Quality Testing and Chlorination of WASA-Quetta and PHED WSS-Sibi Water Supply Systems

PCRWR initiated a project in collaboration with UNICEF focused on water quality testing and chlorination of the water supply systems in Quetta (WASA) and Sibi (PHED-WSS), aiming to provide safe drinking water to the population. The project addresses water contamination caused by pathogens that lead to diseases such as diarrhea, cholera, and gastroenteritis. Effective chlorination methods were applied to mitigate these health risks.

Objectives

- Monitor the water quality of 48 reservoirs and tube wells at 30 WASA locations in Quetta.
- Disinfect water sources using sodium hypochlorite.
- Map water sources based on the results of water quality analysis and provide recommendations for improving safety.

Progress

In Quetta, 152 water samples were tested, with 45% deemed unsafe due to contamination. Key issues included 13% of samples failing physical safety standards, 15% chemical contamination, and 32.2% containing coliform bacteria. In Sibi, 50 water sources were monitored, with 98% of samples found unsafe, primarily due to turbidity, coliform bacteria, and *E. coli* contamination.

To address these issues, sodium hypochlorite was used for chlorination at district water supply schemes in both Quetta and Sibi. In Quetta, the installation of chlorination systems in key reservoirs helped ensure fecal contamination was largely eliminated from the city's water supply. In Sibi, four auto-chlorinators were installed at two water supply schemes to maintain consistent chlorination levels, providing a reliable supply of clean water to the community. Chlorination efforts resulted in residual chlorine levels of 0.75-1.0 mg/L at the source, and 0.1-0.25 ppm at the consumer end.

Additionally, PCRWR conducted post-flood water quality monitoring in flood-affected districts of Sindh, with 45.2% of sources found unsafe for human consumption due to high TDS, coliform bacteria, and fecal contamination. The results were shared with relevant authorities for the selection of safer water sources.

District	Sources
Dadu	392
Naushero Feroze	160
Khairpur	377
Mirpurkhas	159
Sanghar	103
Total	**1191**

Quarterly Monitoring of Mineral and Bottled Water

Pakistan Council of Research in Water Resources (PCRWR), under the Ministry of Water Resources, conducts quarterly monitoring of mineral and bottled water to ensure quality and consumer safety. The initiative aims to identify sub-standard products and enhance the overall quality of bottled and mineral water available to the public.

Key Results:

From July 2023 to June 2024, a total of 763 bottled and mineral water samples were collected from major cities across Pakistan, including Islamabad, Karachi, Lahore, Quetta, and others. These samples were analyzed at the ISO-17025 accredited National Water Quality Laboratory (NWQL) of PCRWR for physico-chemical and microbiological parameters. The results were compared with the permissible limits set by the Pakistan Standard Quality Control Authority (PSQCA).

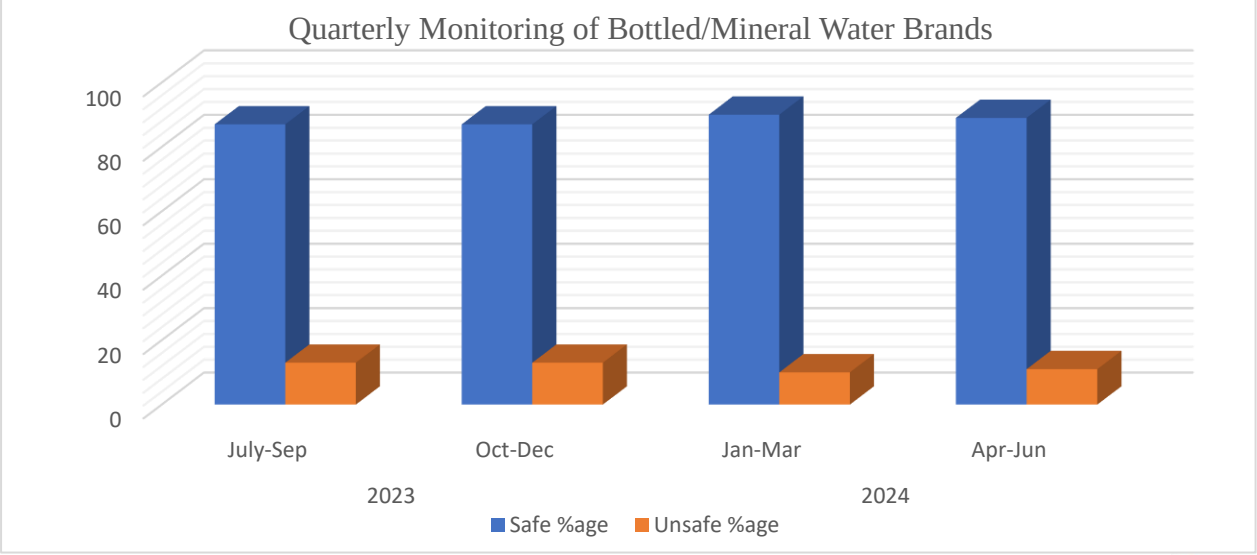
The monitoring revealed that 673 samples met safety standards, while 90 samples were deemed unsafe due to contamination. Unsafe samples were identified based on high levels of chemical contaminants such as Arsenic, Sodium, Potassium, and Total Dissolved Solids (TDS), or microbiological contaminants like Total Coliforms, Fecal Coliforms, and E. coli. Such contamination poses significant health risks, including waterborne diseases and long-term health issues from chemical exposure.

Quarterly findings are shared with the public through print and electronic media and posted on the PCRWR official website. Additionally, reports are sent to the Chief Secretaries of all provinces and the PSQCA, prompting legal actions against identified sub-standard brands. This has led to several interventions by PSQCA and provincial food authorities.

Summary of Findings:

- **July-Sep 2023:** 197 brands tested; 172 safe (87%), 25 unsafe (13%).
- **Oct-Dec 2023:** 172 brands tested; 149 safe (87%), 23 unsafe (13%).
- **Jan-Mar 2024:** 185 brands tested; 166 safe (90%), 19 unsafe (10%).
- **Apr-Jun 2024:** 209 brands tested; 186 safe (89%), 23 unsafe (11%).

This ongoing monitoring effort is crucial for safeguarding public health and ensuring that bottled and mineral water meet established safety standards.



Groundwater Recharge through Rainwater Harvesting in Khyber Pukhtunkhwa

Pakistan Council of Research in Water Resources (PCRWR) in collaboration with UNICEF and the Public Health Engineering Department (PHED) of the Government of Khyber Pakhtunkhwa, has successfully completed groundwater recharge initiatives through rainwater harvesting in the Mansehra, Kohat, and Hangu districts.

In Mansehra, the interventions were implemented at three major sites, with subsequent groundwater table monitoring using a portable TLC Meter. Similarly, in the water-stressed areas of Kohat and Hangu, interventions were carried out at four key sites. Instruments were installed at all locations to monitor the groundwater table effectively. This project aims to enhance water conservation and recharge efforts in these regions, addressing the growing water scarcity challenges.

Establishment of Rainwater Harvesting Systems for Groundwater Recharge in DG Khan and Rajanpur

PCRWR, in collaboration with UNICEF, launched the "Establishment of Rainwater Harvesting System for Groundwater Recharge" project in DG Khan and Rajanpur. This initiative builds on a prior PCRWR study, "Water Quality Monitoring and Mitigation in Flood Affected Areas of Southern Punjab," which found that 72% of groundwater in these districts was unsafe due to high Total Dissolved Solids (TDS). The new project aims to improve groundwater quality and quantity through rainwater harvesting, involving a comprehensive feasibility study to identify potential sites for interventions.

Scope and Objectives:

- Assess current water quality and provide safe drinking water and sanitation to reduce water-borne diseases in flood-affected areas.
- Train local stakeholders and service providers in emergency safe drinking water provision.

Methodology:

1. **Stakeholder Consultation:** Meetings were conducted with over 60 community representatives to align interventions with local needs.
2. **Technical Field Surveys and Mapping:**
    - A digital elevation map was created using DEM (30m x 30m).
    - Geophysical surveys identified suitable sites for groundwater recharge.
    - Water table depth was measured, and a water quality profile was developed based on 1,300 samples.
    - Surface water potential, land use, and catchment area were analyzed for runoff estimation.

Proposed Interventions:

Based on extensive field surveys, specific interventions have been proposed at various sites in DG Khan and Rajanpur to enhance groundwater recharge and improve water quality.

Drought Disaster Preparedness and Management in Cholistan Desert

In Cholistan Desert, the primary source of fresh water is rainwater collected in natural depressions or man-made ponds, locally known as "tobas." With over 1,200 tobas, the total water requirement for Cholistan's 1.66 million inhabitants and livestock is estimated at 2,333 million gallons (Mgal), while the available storage capacity is 1,458 Mgal. This leaves a deficit of 876 Mgal, impacting both humans and wildlife. To address this, PCRWR and UNICEF have initiated a project to mitigate drought conditions in the region.

Objectives

1. Develop sustainable surface water storage through rainwater harvesting to provide drinking water for humans and livestock during severe droughts.
2. Improve the quality of groundwater for human and livestock consumption in marginalized Cholistan areas

Implementation Methodology

The project will develop rainwater harvesting ponds at approximately twenty locations based on feasibility surveys. These ponds are designed to collect 70-80 million gallons of rainwater for human and livestock use. Ponds will be constructed at optimal catchment points to maximize runoff, using similar designs to existing PCRWR ponds. The capacity of each pond will vary based on catchment size, rainfall, and soil characteristics.

Project Benefits and Analysis

The project aims to alleviate poverty by ensuring adequate drinking water for humans and livestock during droughts, improving living conditions in South Punjab. It will also foster a sense of ownership and national cohesion, strengthening the social fabric. As a social sector initiative, it underscores the importance of environmental protection and effective governance in providing essential services.

Investigation of Microbial Diversity and Physico-Chemical Analysis of Tobas in Cholistan Desert

PCRWR's Regional Office in Bahawalpur has initiated a collaborative project with the Biochemistry Department of the Institute of Biochemistry and Biotechnology (IBBB) at The Islamia University of Bahawalpur. The project, titled "Investigation of Microbial Diversity and Physico-Chemical Analysis of Tobas in Cholistan Desert," aims to assess the microbial diversity and physico-chemical properties of selected tobas in the Cholistan Desert.

Collaboration Activities

1. **Technical Support:** PCRWR provides technical assistance for the collection of samples and the physico-chemical analysis of tobas in Cholistan Desert.

2. **Capacity Building:** The project includes training and internships for students to enhance their skills and knowledge.

3. **Joint Activities:** Collaborative academic and research initiatives, including short-term academic programs, are being undertaken.

Performance Evaluation of Water Filtration Plants in Punjab

PCRWR conducted a comprehensive evaluation of 2,543 water filtration plants installed across Punjab. in collaboration with WaterAid Pakistan. All water samples from these plants were analyzed at PCRWR's Head Office, Regional, and District water quality laboratories.

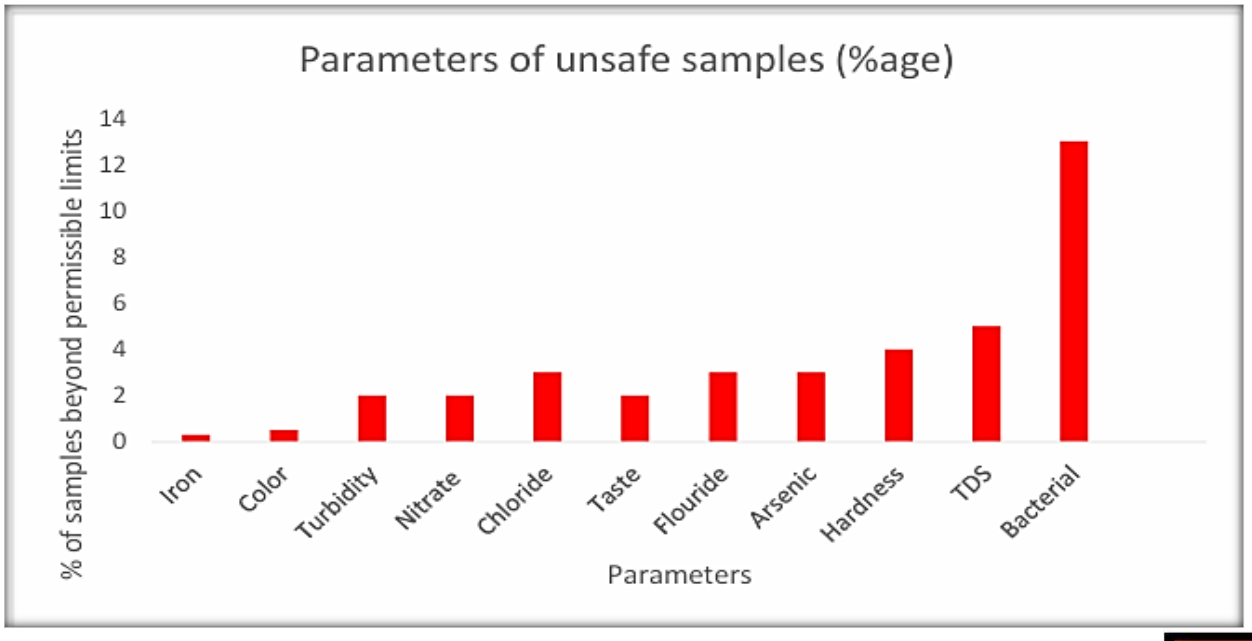
The evaluation revealed that 1,619 (75%) of the 2,146 operational plants provided safe drinking water. Conversely, 527 (25%) of the plants were identified as delivering unsafe water. The analysis of the 2,543 plants uncovered 11 major water quality issues in the unsafe water, including:

- Iron: 7 plants (0.3%)
- Color: 11 plants (0.5%)
- Turbidity: 52 plants (2%)
- Nitrates: 54 plants (2%)
- Chlorides: 58 plants (3%)
- Taste: 40 plants (2%)
- Fluoride: 55 plants (3%)
- Arsenic: 76 plants (3%)
- Hardness: 82 plants (4%)
- Total Dissolved Solids (TDS): 116 plants (5%)
- Total Coliforms: 279 plants (13%)

Ranking of Parameters and Cities Exceeding NDWQS Permissible Limits

The primary causes of unsafe water supply were found to be outdated infrastructure, leakage in the distribution system, intermittent supply, inadequate regular water quality surveillance, insufficient technical capacity of water supply agencies, lack of public awareness regarding quality issues, and improper disposal of solid and liquid waste.

Given that 25% of the functional plants were found to be unsafe, it is imperative for implementing agencies to develop a comprehensive maintenance plan to enhance the safety of public water filtration plants. It is recommended that regular training and certification programs for plant operators be established to ensure proper operation and maintenance of the filtration systems.



Pumping Test Activities

PCRWR Regional Office, Lahore carried out an extensive pumping test from January 5th to 19th, 2023, at the Fauji Fertilizer Company (FFC). The study was conducted on five strategically placed piezometers (observation wells) installed between two main wells, each positioned equidistantly with a depth of 40 meters. The primary objective of the test was to evaluate the drawdown rates associated with pump operations and to develop an optimized schedule for pump rest periods based on the cone of depression formed during extraction.

The pumping test involved continuous monitoring of groundwater levels in the observation wells to assess the rate at which water levels dropped, or "drew down," in response to the pumping activity. This data was critical in understanding the interaction between the wells and the surrounding aquifer system. By measuring the drawdown at different points and intervals, the PCRWR team was able to accurately map the cone of depression, a key factor in determining the influence of the pumping on the aquifer and surrounding water sources.

In addition to analyzing the drawdown, the test also aimed to optimize the operational efficiency of the pumps. Based on the observed data, a rest schedule was designed to allow the aquifer to naturally replenish during non-pumping periods, thereby preventing over-extraction and ensuring the sustainability of the water resource. This approach is crucial for maintaining the balance between water demand and aquifer recovery, particularly in industrial operations like those at FFC, where water is a critical component.

Improving the Tricycle Protocol: One Health Surveillance

PCRWR collaborated with the National Institute of Health (NIH) on the research project titled “Improving the Tricycle Protocol: Upscaling to National Monitoring, Detection of CPE and WGS Pipelines for One Health Surveillance (TRIuMPH),” focusing on Antimicrobial Resistance (AMR) from January 2023 to April 2024. The project engaged seven officials from PCRWR’s Water Quality Laboratories in Islamabad, Lahore, and Peshawar. While NIH addressed human health and NARC focused on the animal sector, PCRWR’s role centered on the environmental aspect.

As part of this project, samples were collected monthly from upstream and downstream river sites, wastewater, and wet markets in Islamabad, Lahore, and Khyber Pakhtunkhwa (KPK). These samples were analyzed for E. coli resistant bacteria using culture techniques and antimicrobial sensitivity testing. The project also included training with both didactic sessions and hands-on laboratory practice. The PCRWR team successfully completed the laboratory work for this project.

Key Events

Pakistan Water Week 2023

Pakistan Council of Research in Water Resources (PCRWR), in collaboration with the International Water Management Institute (IWMI) Pakistan and other esteemed partners, organized Pakistan Water Week 2023 from December 4th to 8th, 2023 in Islamabad. This year's theme ***"Transformative Pathways for Water and Food Systems in a Climate Resilient Pakistan"*** guided a series of events designed to address persistent water and food security issues under the influence of climate change.

International Conference

A three-day international conference, held from December 4th to 6th, 2023, was inaugurated by Prof. Dr. Iqrar Ahmad Khan, Vice Chancellor of the University of Agriculture Faisalabad. In his inaugural address, Prof. Dr. Khan emphasized the need for transformative pathways in water management, noting that traditional agricultural practices, while still prevalent in Pakistan, are outdated and inefficient. He stressed the urgent need for technological advancements and innovative methods to enhance water security. He highlighted importance of the developing a comprehensive and inclusive roadmap to address the imminent water crisis and the impacts of climate change, aiming for a Climate Resilient Pakistan.

Prof. Dr. Iqrar Ahmad Khan, Vice Chancellor (UAF)

Dr. Mark Smith, Director General of IWMI, underscored the impact of climate change on water regimes globally, with Pakistan being particularly vulnerable. He acknowledged ongoing global efforts to combat rising temperatures, including discussions at the Conference of Parties (COP) in Dubai. Dr. Smith praised the collaborative efforts of PCRWR, IWMI, CGIAR (Consultative Group on International Agricultural Research), and provincial governments in advancing water and food security policies. He also announced CGIAR's new initiative on Fragility, Conflict, and Migration (FCM) in Pakistan, aimed at bolstering the resilience of food, land, and water systems in fragile and conflict-affected regions.

Dr. Mark Smith addresses the PWW 2023

Ms. Claudia Ringler, Co-Lead of NEXUS Gains and Director of Natural Resources and Resilience, highlighted the alarming rise in global hunger, with the number of hungry people increasing from 564 million in 2014 to 735 million in 2022. In Pakistan alone, 43 million people are affected. She cited an estimated loss of USD 2.1 billion due to climate change in Pakistan and called for both First World nations and vulnerable countries like Pakistan to implement effective climate adaptation and mitigation strategies. Ms. Ringler

advocated for the NEXUS Gains Approach, which aims to improve water, energy, food, ecosystem, and health sectors collectively, potentially reducing rice acreage in Pakistan by 15 percent and saving two million acre-feet of water.

Dr. Mohsin Hafeez, Director, IWMI, noted that Pakistan, with the sixth-largest population globally, ranks 77th in the food security index and is the eighth most climate-vulnerable country. These factors significantly impact the nation's water and food security. Despite reports indicating that 90% of water is used for agriculture, Dr. Hafeez expressed concerns about the accuracy of these figures due to insufficient scientific studies. He emphasized that Pakistan Water Week 2023 seeks to address the critical climate challenges faced by Pakistan.

Photo of esteemed speakers of the occasion

Photo of esteemed guests at PWW 2023

National Events

Following the international conference, Pakistan Water Week 2023 continued with a two-day national workshop held in Islamabad on December 7th and 8th, 2023. The workshop featured a diverse range of engaging activities and events designed to foster broader participation and raise awareness about water and food security issues.

Mr. Ahmad Irfan Aslam, Federal Minister for Water inaugurating PWW Exhibition Resources

The workshop included interactive ice-breaker activities and energizers to stimulate participant engagement. A highlight of the event was the industrial exhibition, showcasing innovative technologies and

solutions relevant to water management and conservation. Additionally, the workshop featured a series of student competitions, including debates, poster presentations, essay writing, student board games, final year projects, and documentaries. These competitions provided a platform for students to present their ideas and research on various aspects of water and food systems, promoting creative and critical thinking.

The Technology Showcasing Exhibition was officially inaugurated by Mr. Ahmad Irfan Aslam, Federal Minister for Water Resources, who emphasized the importance of technological innovation in addressing water challenges. The exhibition allowed participants to explore cutting-edge technologies and solutions that have the potential to transform water management practices.

The workshop concluded with a closing ceremony where winners of the student competitions were recognized and celebrated. Awards, including cash prizes, certificates, and shields, were presented to the top performers, acknowledging their contributions and excellence in their respective fields. This event not only highlighted the achievements of young researchers and innovators but also underscored the significance of engaging the next generation in addressing critical water and food security challenges.

Overall, the national workshop complemented the international conference by broadening the scope of discussions and involving a wider audience in the dialogue on creating a climate-resilient Pakistan.

Glimpse of the Exhibition at PWW 2023








Some Glimpse of Students' activities and participation at PWW 2023

Consultative Workshop on
Environmental Flow Assessment in the Indus Basin

Pakistan Council of Research in Water Resources (PCRWR), in collaboration with International Water Management Institute (IWMI), has embarked on a crucial series of stakeholder consultations to address Environmental Flow (E-Flow) assessment and management across Pakistan. As part of this initiative, PCRWR and IWMI, Pakistan jointly organized a pivotal workshop on *"Environment Flow Assessment in the Indus Basin"* held in Islamabad on November 14, 2023.

This workshop was a significant event, bringing together experts from a range of national and provincial institutions, including the Indus River System Authority (IRSA), Consultative Group on International Agricultural Research (CGIAR), World Wildlife Fund (WWF), federal and provincial water resource management departments and the Federal Flood Commission (FFC). The event provided a platform for engaging key professionals, planners, and policymakers in the water sector.

The primary objective of the workshop was to collect valuable first-hand information and insights from these stakeholders. By facilitating direct dialogue among experts and decision-makers, the workshop aimed to enhance understanding of the challenges and opportunities related to E-Flow management in the Indus Basin. This collaborative approach is essential for developing effective strategies to ensure sustainable water resources and ecosystem health in one of Pakistan's most critical river systems.

The outcomes of this workshop are expected to play a crucial role in shaping future policies and practices, ultimately contributing to the sustainable management of the Indus Basin's water resources and supporting broader environmental and ecological goals.

Dr. Mohsin Hafeez address the workshop participants

Celebration of
Global Hand Washing Day 2023

Pakistan Council of Research in Water Resources (PCRWR), in collaboration with UNOPS, UNICEF, Water Aid, Muslim Aid, WHO, and Save the Children, spearheaded a nationwide initiative to promote WASH (Water, Sanitation, and Hygiene) awareness in observance of Global Hand Washing Day on October 15, 2023. This initiative involved organizing a series of educational sessions across government schools and universities throughout Pakistan, underscoring a pivotal commitment to enhancing public health and sustainable water management practices.

The WASH Awareness Sessions were conducted in various educational institutions to reach a broad audience, including students and faculty members. These sessions were meticulously crafted to engage participants through a variety of interactive methods. Practical demonstrations, interactive discussions, and expert-led presentations were integral to the sessions, designed to instill a thorough understanding of WASH principles and their significance in daily life.

Hand washing, a fundamental aspect of hygiene, was highlighted as a key component of these educational efforts. Emphasizing the critical importance of proper hand hygiene, the sessions aimed to educate participants about the role of hand washing in preventing the spread of diseases and maintaining overall health. The workshops aimed not only to convey the importance of hand hygiene but also to empower individuals with the knowledge and skills necessary to implement these practices consistently. By integrating these principles into everyday routines, the initiative sought to foster a culture of hygiene and sustainability within educational settings.

This effort reflects a broader commitment to public health and the promotion of sustainable practices. The collaborative approach taken by PCRWR and its partners highlights the importance of collective action in addressing water, sanitation, and hygiene challenges. The success of these awareness sessions underscores the value of educational initiatives in driving long-term behavioral change and improving community health outcomes, paving the way for healthier and more resilient communities across Pakistan.

Group photo of the participants with children





Glimpse of the Global Hand Washing Day Celebration Activities across Pakistan

Consultative Workshop on
Managing Cryosphere and Water Risks in Pakistan

International Centre for Integrated Mountain Development (ICIMOD), in collaboration with Pakistan Council of Research in Water Resources (PCRWR), organized a consultative workshop on *"Managing Cryosphere and Water Risks in Pakistan"* on July 4-5, 2023, at Islamabad. This workshop was a significant event aimed at addressing critical issues related to the cryosphere and its impact on water resources in the Hindu Kush Himalaya (HKH) region.

Dr. Muhammad Ashraf, Chairman of PCRWR, and Mr. Muhammad Ismail, Country Manager of ICIMOD, extended a warm welcome to the distinguished guests. Mr. Ismail highlighted ICIMOD's efforts in managing water risks associated with the cryosphere, emphasizing the organization's role in the HKH region. Dr. Ashraf, in his opening remarks, referred to the HKH region as the "Mother Well" of Pakistan's water resources, highlighting its significance as the primary source of water for the region. He emphasized the need to establish effective linkages between upstream and downstream water users to protect and conserve the cryosphere sustainably.

The workshop featured contributions from experts representing various national organizations and regional member countries. These discussions aimed to address the multifaceted challenges associated with the cryosphere and its impact on water resources. The primary goal of the workshop was to enhance coordination among regional member countries and the Upper Indus Basin Network, fostering collaborative efforts to sustainably manage risks to the cryosphere in the HKH region. By sharing research-based knowledge and ongoing interventions, the workshop sought to promote a unified approach to managing water risks and improving climate resilience in the face of evolving environmental challenges

Group photo of workshop participants

Panel Discussion on
Need for Integrated Approaches for Rainwater Harvesting Systems to Mitigate Urban Flooding in Metropolitan Cities of Pakistan

PCRWR in collaboration with UN-Habitat, hosted a pivotal panel discussion titled "*Need for Integrated Approaches for Rainwater Harvesting Systems to Mitigate Urban Flooding in Metropolitan Cities of Pakistan*" on March 6, 2024, at PCRWR, Islamabad. The panel featured distinguished experts including Dr. Rashid Aftab, Director of the Riphah Institute of Public Policy; Ms. Almas Shakoor from the Shehrsaz Foundation; Mr. Abdul Qayyum from UN-Habitat; and Mr. Dilshad Arshad, Director, PCRWR. The discussion centered on exploring innovative solutions for managing urban flooding through integrated rainwater harvesting systems.

The panelists emphasized that while technological solutions are critical, the role of human capital and effective coordination among urban communities is equally crucial. They argued that integrating rainwater harvesting systems can mitigate flooding, but achieving this requires a coordinated approach that involves community engagement, policy support, and efficient implementation strategies.

The discussion conveyed a key message: in addressing environmental challenges such as urban flooding, the potential of human capital and community involvement should not be underestimated. Effective coordination among various stakeholders is essential for leveraging these resources and implementing successful rainwater harvesting systems.

Photo of key panelist of panel discussion

8th International Water Conference

Pakistan Council of Research in Water Resources (PCRWR) in collaboration with Riphah International University and UNICEF Pakistan organized the 8th International Water Conference (8IWC) on March 6-7, 2024 at PCRWR, Islamabad. The theme of the conference this year was *"Valuing Water for Sustainability"*. The conference was inaugurated by Dr. Hifza Rasheed, Director General, PCRWR, who highlighted Pakistan's vulnerability to climate change and its impact on water resources. She called for immediate and coordinated action to address the emerging challenges in water management. Dr. Rashid Aftab, Director, Public Policy at Riphah University, provided an overview of the two-day event, which was structured around thematic sessions and panel discussions aimed at promoting sustainable water practices.

Distinguished guests of honor, including Dr. Anis Ahmed, Vice Chancellor of Riphah University, and Prof. Dr. Muhammad Abid, UNESCO Chair at COMSATS University Wah Campus, delivered keynote addresses. They emphasized the importance of behavioral change and integrated data collection in water conservation efforts. Prof. Dr. Athar Hussain, Head of the Department of Meteorology at COMSATS Islamabad, presented his research on climate change and proposed measures to reduce its impact on water resources.

Professor Dr. Anis Ahmad Khan addressing on the occasion

Dr. Muhammad Ashraf, Advisor to the International Water Management Institute (IWMI) and Former Chairman of PCRWR, offered insights into the ecological and religious significance of water, stressing the need for behavioral change to prevent water wastage. Ms. Kiran Kazi, UNICEF Representative, focused on the role of innovation and collaboration in addressing water sector challenges, highlighting the importance of engaging youth as key agents of change.

The conference featured panel discussions: "*Leveraging Innovation to Secure Pakistan's Water Future*". Thematic sessions covered critical areas such as "Climate Change Adaptability, Water Governance, and Glacial Lake Outburst Floods (GLOF)," "Water Sanitation and Hygiene (WASH)," and "Water Productivity: Water, Energy, Food Nexus & Hydro Diplomacy." A total of 52 participants presented their research findings, contributing valuable insights into water sustainability.

Group photo of panelists

Dr. Rashid Aftab concluded the conference with closing remarks,

summarizing the key outcomes and reinforcing the need for continued efforts toward water sustainability. The event concluded with Ms. Saiqa Imran, Director of Water Quality at PCRWR, delivering the vote of thanks and distributing certificates and shields to participants and organizers. The 8IWC underscored the critical importance of valuing water in the face of climate change and urbanization, fostering a collaborative approach to ensuring a sustainable water future for Pakistan.

Group photo of workshop participants

Group photo of panel discussion participants

Inaugural Ceremony of
Intelligent Irrigation Technology Promotion Center

PCRWR held the inaugural ceremony for the Intelligent Irrigation Technology Promotion Center at its R&D farm in Sialmore. The event took place at the PCRWR Headquarters, Islamabad on November 30, 2023, and was attended by representatives from PCRWR and the China Water Resources Bei Fang Investigation Design and Research Co. Limited (BIDR).

The ceremony was initiated by Dr. Hifza Rasheed, Director General, PCRWR, who welcomed the attendees and addressed the significant challenges faced in water resources management in Pakistan. Dr. Rasheed underscored the urgent need for technological innovation to address these challenges. Ms. Bareerah Fatima, Deputy Director, PCRWR, provided an overview of PCRWR's research infrastructure. She detailed the various agroecological zones and the spatial and temporal variations in water resource availability and use.

Mr. Liu Hairui, Vice President, BIDR, highlighted the Chinese government's various initiatives in water management. He expressed hope that the collaboration between PCRWR and BIDR would effectively address issues related to crop productivity and water management at the farm level. The ceremony concluded with Dr. Hifza Rasheed and Mr. Liu Hairui, accompanied by their teams, officially inaugurating the Intelligent Irrigation Technology Promotion Center.

A glimpse of the ceremony

In-Country Capacity Building Training Program for Enhancing Water Quality Systems to Achieve SDG 6.1 in Pakistan

PCRWR in collaboration with the Ministry of Climate Change, Government of Pakistan, and the Korea International Cooperation Agency (KOICA), organized a specialized training program at PCRWR, Islamabad on August 15, 2023. This program was designed to enhance water quality systems and contribute to achieving Sustainable Development Goal (SDG) 6.1.

The training session was attended by professionals from the Public Health Engineering Departments (PHED) of Punjab and Khyber Pakhtunkhwa. Mr. Jeho Yeon, Director, KOICA, Dr. Jaewon Choi from K-Water, and Ms. Heejung Son, Senior Manager of Capacity Building from K-Water, were the distinguished guests who addressed the attendees.

Mr. Jeho Yeon, Director of KOICA address the participants

Dr. Muhammad Ashraf, Chairman, PCRWR, highlighted the significance of human resource development in enhancing performance and productivity within the water sector. Dr. Hifza Rasheed, Director General, PCRWR, provided an overview of the training program and discussed the current water quality scenario in Pakistan. Mr. Jeho Yeon explained the program's objectives, emphasizing the importance of equipping professionals with technical knowledge to strengthen water quality monitoring systems and meet SDG targets. Ms. Heejung Son provided insights into the Master Training Program conducted at the K-Water Academy in Korea.

Picture of Ms. Heejung Son, Senior Manager K Water

Group photo of participants

Seminar on
Disaster Risk Management in Pakistan

A one-day seminar on "*Disaster Risk Management in Pakistan*" was jointly organized by the Pakistan Council of Research in Water Resources (PCRWR), the Society of Economic Geologists and Mineral Technologists (SEGMITE), Pakistan Science Foundation (PSF), and the Sindh Environmental Protection Agency (SEPA) at PCRWR, Tandojam on August 24, 2023. The seminar provided a crucial platform for addressing disaster risk management, an area of increasing importance given the escalating frequency and severity of natural and man-made disasters in Pakistan.

The seminar brought together a diverse group of experts, policymakers, and practitioners who shared their knowledge on various aspects of disaster risk management, including assessment, preparedness, mitigation, and response. Presentations covered a wide range of topics, providing insights into current practices and challenges in managing disaster risks. These were further enriched by panel discussions that facilitated a dynamic exchange of ideas on the complexities and opportunities in the field.

Participants commended PCRWR for organizing the event and emphasized the critical need for increased public awareness and engagement in disaster preparedness. The seminar highlighted the necessity of integrating scientific research with practical policy measures and community-based strategies to build resilience and improve response mechanisms.

Group photo of the workshop

2nd KOICA Performance Sharing Workshop
Enhancing Water Quality Monitoring to Achieve SDG-6 in Pakistan

PCRWR, in collaboration with the Korea International Cooperation Agency (KOICA) and the Ministry of Climate Change, hosted the 2nd Performance Sharing Workshop under the project "*Enhancing Water Quality Monitoring to Achieve SDG-6 in Pakistan*" on September 20, 2023, in Islamabad. This workshop was a key event aimed at evaluating and sharing progress on the project's objectives and accomplishments.

The workshop was attended by notable figures including, Mr. Je Ho Yeon, Country Director of KOICA; Mr. Jawad Rabbani, Deputy Director, Ministry of Planning Development and Special Initiatives (MoPD&SI); Dr. Hifza Rasheed, Director General, PCRWR; and Sardar Khan Zimree, Director General, Water Management at the Capital Development Authority (CDA).

Dr. Hifza Rasheed, emphasized PCRWR's key role in advancing water quality monitoring and the impact of local training programs on improving water management practices to achieve SDG 6. Mr. Je Ho Yeon, KOICA's Country Director, praised PCRWR's efforts in water quality monitoring and highlighted the importance of ongoing collaboration. The workshop provided a platform for performance evaluation, knowledge exchange, and strengthened commitment to enhancing water quality monitoring and achieving SDG 6 in Pakistan.

Group photo of workshop participants

Research Colloquium on
World Water Day 2024

PCRWR hosted a Research Colloquium at its Regional Office in Lahore on March 28, 2024 in observance of World Water Day 2024. The event brought together a diverse group of participants from various research-oriented institutions, including the University of Engineering and Technology (UET) Center of Excellence in Water Resource Engineering (CEWRE), the Irrigation Research Institute (IRI), the University of Veterinary and Animal Sciences (UVAS), and the University of Agriculture Faisalabad (UAF), among others.

The colloquium featured presentations from Engr. Faakhar Raza, Regional Director, PCRWR, who provided an overview of PCRWR's research activities and ongoing projects. This included a discussion on key initiatives aimed at advancing water research and management in Pakistan.

Attendees also shared the results and insights from their individual research efforts, contributing to a comprehensive discussion on current trends, challenges, and opportunities in the field of water resource management. The event facilitated an exchange of knowledge and ideas, promoting the potential for joint studies and collaborations with PCRWR. This collaborative approach is vital for enhancing the quality and progression of water research initiatives and addressing critical water issues in Pakistan. The Research Colloquium underscored the importance of collaborative research in advancing water resource management and highlighted the role of academic and research institutions in contributing to sustainable solutions for water challenges.

Group photo of the participants

Stakeholders Consultation on
Final Draft of the Governance Framework for the Protection of the Karez System Cultural Landscape

PCRWR organized a stakeholders' consultation meeting at BUITEMS, Quetta on November 23, 2023 to review the final draft of the Governance Framework for the protection of the Karez System Cultural Landscape (KSCL). This framework is a key component of the nomination dossier for securing World Heritage status for the Karez System.

The development of the Governance Framework involved a comprehensive literature review of existing studies, policy instruments, acts, and regulations related to the Karez System. Following this, extensive consultations with stakeholders were organized to gather valuable insights and feedback. A renowned law firm was engaged to draft and finalize the document, ensuring its robustness and alignment with legal standards.

The consultation was attended by various stakeholders who provided constructive feedback and expressed their support for the initiative. They acknowledged the efforts of PCRWR and UNESCO in advancing the preservation of the Karez System and committed to supporting the nomination of the KSCL for inclusion in the World Heritage list.

The feedback received during this meeting will be helpful in refining the Governance Framework and enhancing its effectiveness in protecting the Karez System Cultural Landscape. This collaborative effort highlights the importance of stakeholder engagement in safeguarding cultural heritage.

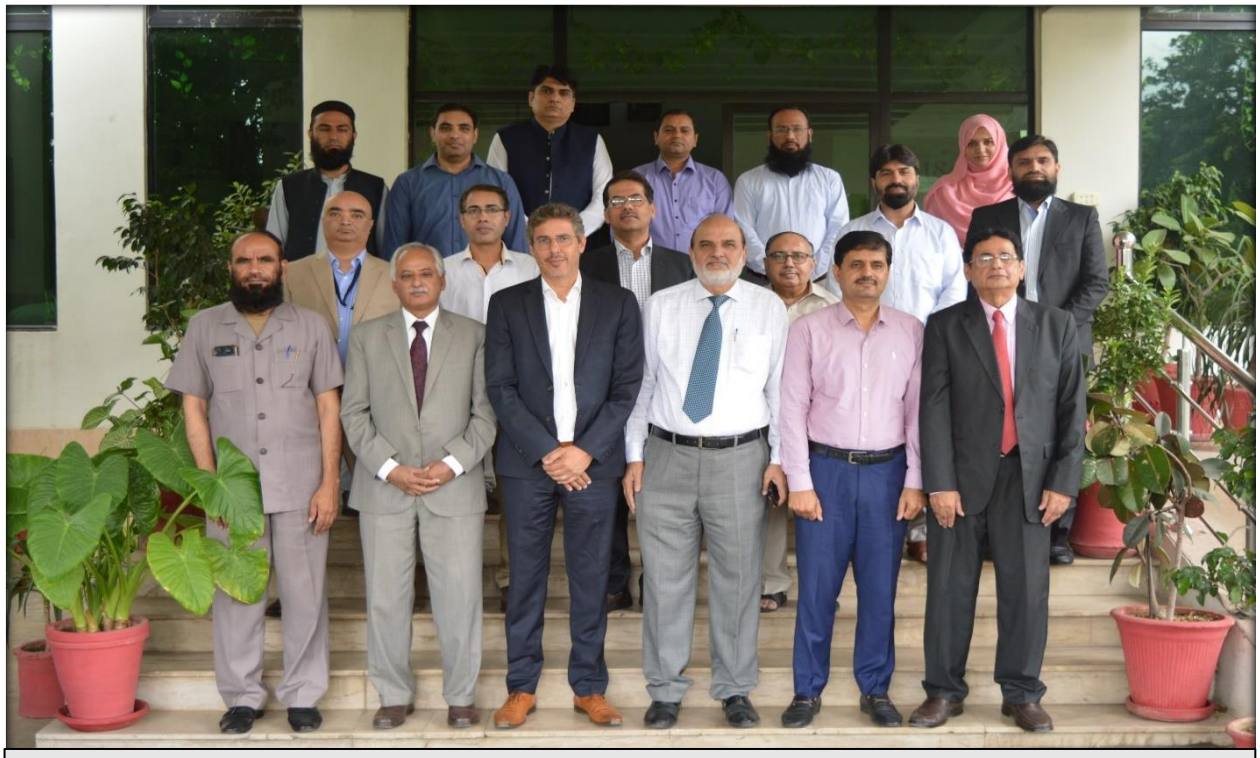
Glimpse of the occasion

Meeting of the
Pakistan National Committee on Intergovernmental Hydrological Programme (PNC-IHP) of UNESCO

A significant meeting of the Pakistan National Committee on the Intergovernmental Hydrological Programme (IHP) of UNESCO was held at the PCRWR Headquarters, Islamabad on September 5, 2023. The meeting was chaired by Dr. Muhammad Ashraf, Chairman, PCRWR, and attended by approximately 25 participants from IHP member and stakeholder organizations, with an additional 7 participants joining virtually from provincial governments. Dr. Muhammad Ashraf opened the meeting by welcoming all attendees and providing an overview of the salient features of the IHP-IX phase. He emphasized the crucial role of collaboration among committee members to enhance the committee's effectiveness and vibrancy.

Dr. Youssef Filali-Meknassi, Director of UNESCO, acknowledged the efforts of the PNC-IHP and expressed gratitude to the participants for their active engagement. He elaborated on various projects and initiatives undertaken by UNESCO to improve water management and governance in Pakistan, including capacity-building activities for water professionals.

Following the inaugural session, detailed presentations were delivered by provincial representatives and other stakeholder organizations, focusing on activities related to IHP-IX. The meeting also included in-depth discussions aimed at identifying practical steps forward for advancing the objectives of the IHP and addressing water resource challenges in Pakistan.



Group photo of the participants

Stakeholders Consultation to Develop AMR Surveillance Strategy

PCRWR hosted a pivotal meeting of major stakeholders at its headquarters in Islamabad to discuss the development of an Antimicrobial Resistance (AMR) Surveillance Strategy for Pakistan on April 30, 2024. AMR is currently ranked among the top 10 global health challenges, and in Pakistan, the issue is exacerbated by the uncontrolled use of antibiotics and biocides across human health, agriculture, aquaculture, and livestock sectors. In response, PCRWR, in collaboration with the Ministry of Health, is actively engaged in several initiatives, including the development of the AMR Surveillance Strategy, the National Action Plan 2.0, and AMR Stewardship in Pakistan.

The Microbiology Laboratory of NWQL at PCRWR Islamabad has been selected for the implementation of Fleming's Fund Phase II for AMR surveillance in the environment. This phase aims to establish a robust AMR Surveillance Strategy tailored to Pakistan's unique environmental conditions. The meeting, chaired by Dr. Hifza Rasheed, Director General, PCRWR.

During the meeting, the participants engaged in detailed discussions on the Terms of Reference (TORs) for the proposed Technical Working Group, aiming to develop a comprehensive and effective AMR Surveillance Strategy. Following the discussions, the stakeholders visited the Microbiology Laboratory of NWQL, where they explored potential areas for future collaboration. The attendees expressed keen interest in partnering with PCRWR for ongoing and future initiatives related to AMR surveillance. This meeting marked a significant step toward strengthening Pakistan's response to AMR by fostering collaboration among key stakeholders.

Glimpse of the meeting

Focus Group Discussions on
Sustainable Groundwater Governance in Pakistan

A two days of Focus Group Discussions (FGD) as part of the initiative "*Exploring the Corridors of Science, Policy, and Practice Interface - Sustainable Groundwater Governance in Pakistan*," were held on September 18-19, 2023. The discussions took place at PCRWR in Lahore and at the PCRWR R&D Centre in Sialmore, respectively.

The FGDs brought together a diverse group of participants, including researchers from academic institutions such as the Center of Excellence in Water Resource Engineering (CEWRE), as well as stakeholders from the On-Farm Water Management (OFWM) sector, the Water Resource Zone (WRZ), and various development sectors. These sessions were instrumental in exploring the multifaceted issues surrounding groundwater governance, with a focus on both scientific research and practical application.

In addition to academic and sectoral experts, farmers from various regions in District Sargodha were invited to the PCRWR R&D Centre in Sialmore. Their participation was crucial for providing firsthand insights into groundwater usage and the challenges associated with both the quantity and quality of groundwater in agricultural practices. The discussions highlighted key issues such as groundwater depletion, contamination, and the need for sustainable management practices.

The engagement of diverse stakeholders in these FGDs underscored the importance of integrating scientific research with practical experiences to develop effective strategies for groundwater management. This initiative is a critical step towards achieving sustainable groundwater governance and addressing the pressing challenges faced by both agricultural and non-agricultural sectors in Pakistan.

A glimpse of the FGD

6th Meeting of
Steering Committee on the Possible Nomination of the Karez Cultural Landscape of Balochistan as a World Heritage Site

The 6th meeting of the Steering Committee for the potential nomination of the Karez System Cultural Landscape (KSCL) of Balochistan as a World Heritage site was held on November 24, 2023, at Quetta. The primary aim of this meeting was to update the committee on the finalized governance framework developed with the support of PCRWR and UNESCO.

During the meeting, the representative from the legal firm responsible for drafting the framework presented a comprehensive overview of the document. This presentation detailed the governance strategies designed to protect and manage the Karez System Cultural Landscape effectively.

The committee members expressed their appreciation for the collaborative efforts of PCRWR and UNESCO in advancing this important initiative. They provided valuable feedback on the governance framework, suggesting enhancements to ensure its effectiveness and practical implementation.

This meeting was crucial for refining the governance framework and reinforcing the steps needed for the successful nomination of the Karez System Cultural Landscape as a World Heritage site. The insights and recommendations provided by the committee will play a significant role in advancing this nomination and preserving the cultural heritage of the Karez system.

Glimpse of the meeting

PCRWR's Role in Implementing WASH-FIT in Healthcare Facilities

The Pakistan Council of Research in Water Resources (PCRWR) has been instrumental in implementing the Water and Sanitation for Health Facility Improvement Tool (WASH-FIT) across healthcare facilities in Pakistan. In collaboration with UNICEF, PCRWR provided technical support to customize the WASH-FIT tools for the specific requirements of healthcare environments.

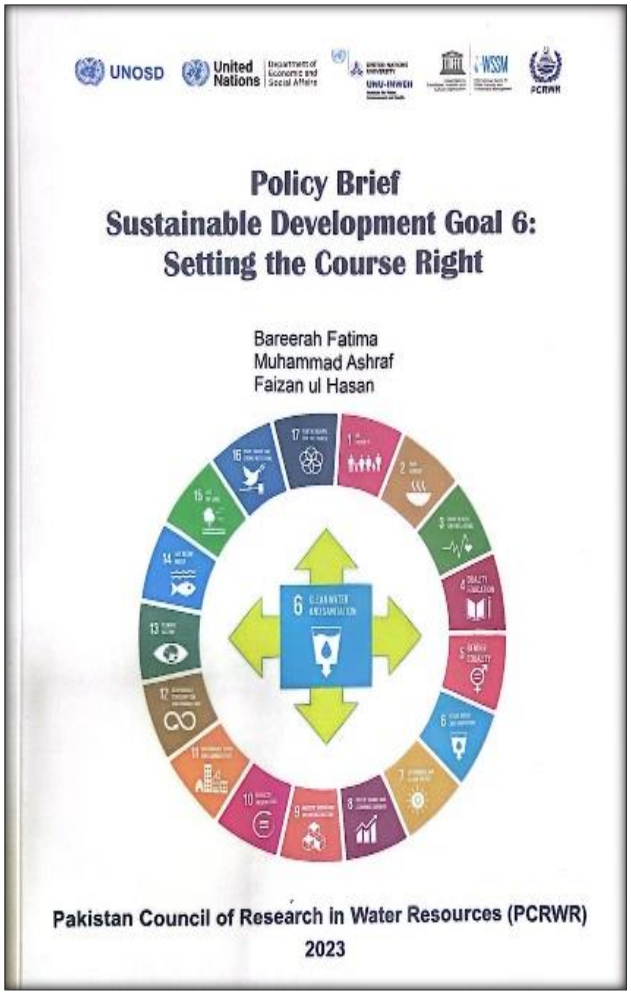
PCRWR also conducted assessments of the national health WASH infrastructure, with a particular emphasis on waste management. These initiatives are pivotal in improving WASH conditions in healthcare facilities, supporting global efforts to enhance healthcare infrastructure and reduce infection rates.

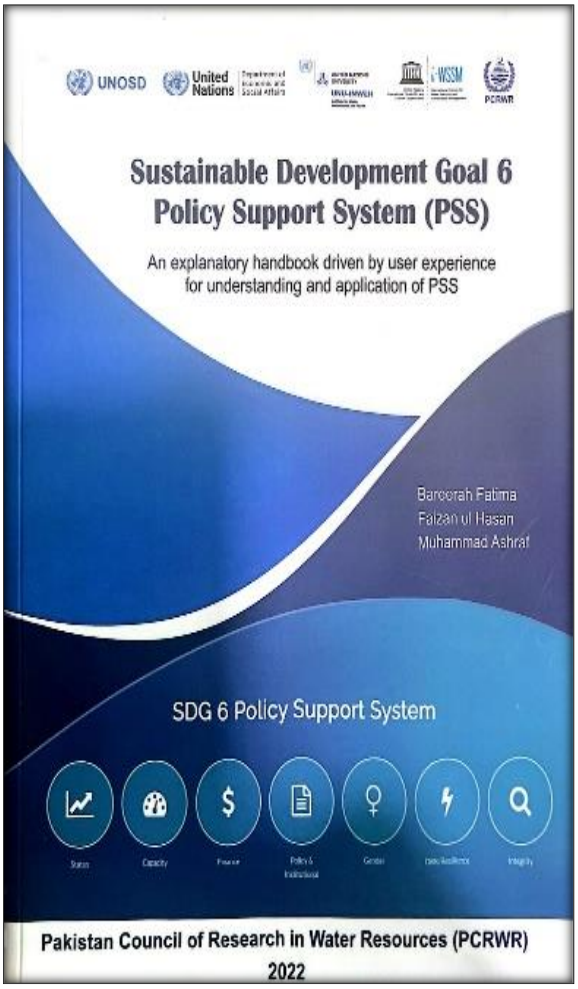
Virtual Participation in
Third Phase of the Project "Water in the World We Want" Cambodia

PCRWR participated virtually in the final workshop of the third phase of the "Water in the World We Want" project from February 20 to 22, 2024 held in Cambodia. This initiative, led by the United Nations University Institute for Water, Environment and Health (UNU-INWEH), focuses on accelerating the achievement of water-related Sustainable Development Goals (SDGs). As a regional hub and focal organization for this project, PCRWR has been involved since its initial phase in 2017.

The final workshop, held in Phnom Penh, Cambodia, was jointly organized by UNOSD, UNU-INWEH, the Ministry of Environment of the Republic of Korea, the Korea Environment Corporation (K-eco), UNESCO International Centre for Water Security and Sustainable Management (UNESCO i-WSSM), the Korea Water Resources Corporation (K-water), and the United Nations Environment Programme (UNEP).

During the workshop, PCRWR's research team presented key achievements and lessons learned from their involvement in the project. Two knowledge products developed by PCRWR were also launched during this forum. The event brought together participants from Brazil, the Republic of Korea, Cambodia, and Tunisia to share insights and advancements related to water management and SDG implementation.





Vehicles Handover Ceremony

A delegation from the PCRWR, led by Dr. Hifza Rasheed, Director General (Water Quality), attended the Vehicles Handover Ceremony for the project "Capacity Building on Water Quality Monitoring and SDG 6 (6.1) Reporting (KOICA/MoCC)" at the Office of the Chief Minister KPK in Peshawar on January 25, 2024,. The ceremony marked the handover of eight mobile water testing laboratories to the Government of Khyber Pakhtunkhwa and a field monitoring van worth Rs. 11 million to PCRWR.

The event was attended by senior officials from the Government of Khyber Pakhtunkhwa, as well as Country Directors of KOICA and UNOPS. The Chief Minister of Khyber Pakhtunkhwa officially handed over the keys to the field monitoring van to the representatives of PCRWR and the Public Health Engineering Department (PHED) of Khyber Pakhtunkhwa, signifying a collaborative effort to enhance water quality monitoring and reporting in the region

A glimpse of the ceremony

Participation in
IHP Regional Steering Committee

Dr. Hifza Rasheed, Director General PCRWR, participated in the 29th IHP Regional Steering Committee (RSC) Meeting for Asia and the Pacific alongside the 9th International Conference on Flood Management (ICFM9) at the Epochal Tsukuba International Congress Center in Tsukuba, Japan, from February 19-22, 2023.

In her detailed presentation, Dr. Rasheed addressed the recent flood challenges in Pakistan, emphasizing the country's vulnerability to climate change, the impacts of the 2022 floods, and the legal frameworks for improved water governance. She outlined flood control and management efforts in Pakistan, including ongoing projects and strategies for flood resilience. Dr. Rasheed also highlighted PCRWR's flood response and Japan's support for flood relief activities.

Participation in 3rd High-Level Water Conference on International Decade for Action 2018-2028

PCRWR participated in the 3rd High-Level Water Conference on the International Decade for Action 2018-2028 held in Dushanbe, Tajikistan from June 10-13, 2024. At the conference, PCRWR was involved in a side event titled "Accelerating the Achievements of Water-Related SDGs: The SDG 6 Policy Support System (SDG-PSS)," organized by the United Nations Office for Sustainable Development.

Group photo of participants

During this side event, Mr. Muhammad Kashif Manzoor, Deputy Director, PCRWR, presented on the application of the SDG 6.0 Policy Support System and its implementation within Pakistan. As a panelist, he shared insights and experiences related to the use of SDG-PSS in advancing water-related Sustainable Development Goals (SDGs) and contributed to discussions on effective strategies for achieving these goals.

PCRWR's Hybrid Wetlands Earn UNESCO Ecohydrology Recognition

Pakistan Council of Research in Water Resources (PCRWR) has pioneered the use of treated wastewater for horticultural and agricultural applications in response to water scarcity exacerbated by climate change. PCRWR's innovative approach involves the construction of hybrid wetlands designed to effectively remove pollutants, enhance cost-efficiency, and conserve energy.

Aligned with Pakistan's National Water Policy, PCRWR's model constructed wetlands covering 700 sq. ft demonstrate the principles of Reduce, Recycle, and Reuse. These wetlands facilitate environmentally sustainable water conservation, improve water quality, and support biomass production. By channeling wastewater from three building blocks, including chemical and microbiology laboratories, to these hybrid wetlands, PCRWR ensures compliance with national environmental standards. The treated water is repurposed for irrigation and land flushing, creating a synergistic system that mitigates ecological risks and bolsters aquatic resilience.

This innovative system has recently been recognized and included in the Global Network of UNESCO Ecohydrology Demonstration Sites for 2024, marking a significant achievement in the field of ecohydrology.

Picture wastewater recycling system for wetlands development

Launching Ceremony of Technical Reports

The Drainage and Reclamation Institute of Pakistan (DRIP), a key unit of the Pakistan Council of Research in Water Resources (PCRWR), hosted a ceremony to launch two significant technical reports in Tando Jam on February 27, 2024. The reports, titled *"Exploring Groundwater Dynamics: A Comprehensive Investigation and Spatial Mapping in Canal Command Areas of Sindh*" and "*Beneath the Sands: A Comprehensive Study of Groundwater in the Tharparkar Region,"* provide an in-depth analysis of groundwater issues in Sindh.

The event was presided over by the Vice Chancellor of Sindh Agriculture University (SAU) Tando Jam and co-chaired by notable experts including Dr. Muhammad Ashraf, Former Chairman of PCRWR; Mr. Mohsin Hafeez, Country Representative of IWMI Pakistan Office; Mr. Jai Ram, General Manager of Sindh Irrigation and Drainage Authority (SIDA); and Dr. Bakhshal Khan Lashari, Professor Emeritus at Mehran University of Engineering and Technology (MUET).

The ceremony was attended by a diverse group of professionals from institutions such as Mehran University, Sindh Agriculture University, Pakistan Agricultural Research Council (PARC), Nuclear Institute of Agriculture, WAPDA, and Sindh Agriculture Water Management and Extension Departments.

This event marks a pivotal step in enhancing the understanding of groundwater dynamics in Sindh, offering new avenues for future research and collaboration. It underscored the critical role of PCRWR's work in the Tharparkar region and the canal command areas, serving as a platform for knowledge-sharing among experts. The insights and data provided by these reports are expected to guide future water resource management strategies, fostering a collaborative approach to addressing groundwater challenges in the region.

Group photo of participants

Establishment of
Advanced Molecular Laboratory for AMR Surveillance

PCRWR in collaboration with UNOPS, has established a state-of-the-art Molecular Laboratory at the National Water Quality Laboratory (NWQL) in Islamabad. The laboratory is equipped with two high-tech instruments, Vitek and Polymerase Chain Reaction (PCR) systems, to characterize antimicrobials and trace their resistance development, transmission, and spread trends in the environment.

PCRWR professionals have already completed a collaborative study with the National Institute of Health (NIH) and the World Health Organization (WHO) on antimicrobial environment surveillance. This study identified the frequency of resistant E. coli in surface water bodies and wastewater, contributing valuable insights into environmental AMR patterns.

Additionally, PCRWR experts are participating in the Fleming Fund Fellowship Scheme to enhance their laboratory technical skills for science-based environmental surveillance. The focus is on using Vibrio cholerae as an indicator organism to control the prevalence of waterborne outbreaks in Pakistan, while also strengthening the institution's profile and collaborations in AMR networks. This new molecular laboratory marks a significant advancement in Pakistan's efforts to address the challenges and gaps in environmental AMR surveillance, positioning PCRWR at the forefront of monitoring and mitigating antimicrobial resistance in the environment.

ISO 17025:2017 Accreditation and EPA Certification

The National Water Quality Laboratory (NWQL) of PCRWR has maintained its ISO 17025 accreditation status since 2007 and currently holds this prestigious accreditation with the Pakistan National Accreditation Council (PNAC) until February 2025. This longstanding commitment to quality testing demonstrates NWQL's adherence to international standards.


Pakistan National Accreditation Council
Ministry of Science & Technology
Government of Pakistan
Islamabad
PNAC
Certificate of Accreditation
is awarded to
National Water Quality Laboratory (NWQL)
Pakistan Council of Research in Water Resource (PCRWR)
Khayaben-e-Johar Road, H-8/1
Islamabad, Pakistan
in accordance with the requirements of ISO/IEC 17025:2017
The accreditation is subject to regular surveillance and compliance to the requirements of PNAC
For scope of accreditation, see Appendix
Accreditation Certificate Number: LAB 48
Date of Issue: 16-01-2020
Valid until 15-01-2023
Director General

Additionally, on April 16, 2024, the laboratory achieved another milestone by obtaining certification from Pakistan's Environmental Protection Agency (EPA), under the Ministry of Climate Change. This certification is crucial for providing certified testing services to industries in Pakistan, in compliance with the Environmental Protection Ordinance

Human Resource Development

Two-Days Training of Trainers on Risk-Based Water Quality Surveillance & Monitoring

On July 19-20, 2023, PCRWR, in collaboration with the Public Health Engineering Department (PHED) Sindh and supported by the World Health Organization (WHO), conducted a Training of Trainers on "Risk-Based Water Quality Surveillance & Monitoring" at PCRWR Regional Office, Karachi. The training aimed to enhance the capabilities of professionals in risk-based approaches to water quality monitoring and surveillance.

The training included theoretical sessions and hands-on exercises, and was attended by chemists, laboratory staff, field assistants, and engineers from the Karachi Water Supply and Sanitation Board (KW&SB), PHED, and various academic institutions. Participants engaged in comprehensive training sessions designed to improve their skills in managing water quality risks.

Two-Day Training of Teachers on WASH in Schools

PCRWR in collaboration with UNICEF Pakistan, is advancing the School WASH project to enhance WASH facilities in schools. As part of this initiative, PCRWR organizes periodic WASH awareness sessions to build capacity among teachers, staff, and students

In preparation for the project's implementation, PCRWR, with support from UNICEF Pakistan and the Ministry of Water Resources, held a two-day training session for teachers from selected schools. The training took place at PCRWR's Islamabad office on September 4-5, 2023, focusing on effective WASH practices and program integration.

Capacity Building Training for Water Quality Laboratories

From January 31 to February 2, 2024, PCRWR Regional Office Karachi organized a capacity-building training program aimed at enhancing the capabilities of PCRWR professionals in Sindh. The training focused on strengthening water quality laboratories across the region. Held at PCRWR Regional Office Karachi, the program was designed to improve technical skills and operational efficiencies within these laboratories, ensuring better management and analysis of water quality.

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Two Days Training on Application of Drone Techniques

On September 12-13, 2023, PCRWR, in collaboration with the International Water Management Institute (IWMI) Pakistan and the Forest Department of the Government of Punjab, organized a training session on the application of drone techniques in smart agriculture at the PCRWR R&D Farm in Sialmore

The training aimed to enhance agricultural practices through the use of advanced drone technology. Participants included professionals from the Agriculture Department of the Government of Khyber Pakhtunkhwa, who joined local experts and practitioners in exploring innovative applications of drones for monitoring and managing agricultural practices.

The workshop provided a comprehensive overview of how drones can be used to improve agricultural efficiency, from crop monitoring to soil analysis. The session included both theoretical insights and practical demonstrations, equipping attendees with valuable skills to integrate drone technology into their agricultural operations.

This training was crucial for advancing smart agriculture practices and showcased the potential of drone technology to transform traditional farming methods, improving productivity and sustainability in the sector.

Two-Day Training Workshop on Water Testing Techniques Held in Collaboration with Muslim Hands

On October 3-4, 2023, a two-days training workshop on water quality testing, in collaboration with Muslim Hands, was conducted at the PCRWR, Islamabad. The workshop aimed to enhance the capacity of Muslim Hands' regional field staff and country office teams in using the DelAqua Kit, Chlorine Testing Kit, and Arsenic Testing Kit for water quality testing.

PCRWR and Muslim Hands jointly facilitated the training sessions, which included both didactic presentations and hands-on practice with the testing kits. A total of 25 staff members, including teams from regional offices and the country office WASH teams, participated in the workshop. The training provided in-depth knowledge and practical skills in using the DelAqua Kit, as well as chlorine and arsenic testing methods.

The workshop concluded with remarks from Dr. Hifza Rasheed, Director General (Water Quality), PCRWR, and Syed Zia ul Noor, Country Director of Muslim Hands Pakistan. Certificates were distributed to the participants, marking the successful completion of the training.

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Two-Day Teacher Training on Rainwater Harvesting and WASH Practices Held at Islamabad Model Schools

On February 15-16, 2024, PCRWR in collaboration with UNICEF, organized a two-day training program for teachers from Islamabad Model Schools. The training aimed to enhance teachers' knowledge and awareness of Rainwater Harvesting Systems and Water, Sanitation, and Hygiene (WASH) practices in schools.

Dr. Hifza Rasheed, Director General, PCRWR, inaugurated the event with opening remarks, providing an overview of the challenges and objectives related to health and hygiene in schools. She emphasized that PCRWR's 24 regional and district laboratories have adopted 48 schools to promote a clean and green environment, ensuring access to safe drinking water and the implementation of improved WASH practices. Additionally, she highlighted the installation of rainwater harvesting systems in these schools as a vital step toward water conservation.

The training session was led by Dr. Naheed Rajper, UNICEF Coordinator, who provided an insightful introduction to WASH in schools. This was followed by a series of lectures delivered by PCRWR's Water Quality Experts, covering topics such as rainwater harvesting systems, safe drinking water, and effective WASH management in school settings. The interactive session included a group presentation activity to reinforce learning and practical application.

The training concluded with remarks from Ms. Saiqa Imran, Director of Water Quality at PCRWR, who emphasized the importance of the teachers' role in promoting these practices. Certificates were distributed to all participants, marking the successful completion of the program

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PCRWR Completes One-Year Capacity Building Program on Enhancing Water Quality for SDG 6

PCRWR has successfully concluded a one-year capacity-building program titled "Enhancing Water Quality System to Achieve SDG 6 in Pakistan." Held at the National Capacity Building Institute (NCBI) in Islamabad, the program aimed to strengthen the skills of professionals in water supply services, including the Public Health Engineering Department, focusing on water quality monitoring and improvement.

The program, which ran from August 15, 2023, to June 2024, emphasized practical training, dedicating 70% of the sessions to hands-on practice and 30% to lectures. Participants gained experience in water quality testing using internationally recognized procedures at PCRWR's National Water Quality Laboratory (NWQL). A total of 116 professionals from Punjab and Khyber Pakhtunkhwa's Public Health Engineering Department and the Environmental Protection Agency (EPA) participated, divided into two groups: 38 Research Officers and Junior Research Officers (trained in three batches) and 78 Laboratory Assistants (trained in five batches).

Supported by the Korea International Cooperation Agency (KOICA), this comprehensive 29-week program included basic training and refresher courses, significantly enhancing the capacity of provincial water supply agencies. With the skills acquired, participants are now better equipped to monitor water quality and contribute to reliable data reporting for Sustainable Development Goal 6 (SDG 6), specifically Indicator 6.1.1, aiding Pakistan's efforts in achieving clean water and sanitation for all.

Farmers Field Day

PCRWR organized a Farmer Field Day at its R&D Center in Tando Jam on January 30, 2024. The event focused on best water management practices for sugarcane cultivation and attracted 25 farmers from the Sindh districts of Hyderabad, Tando Allahyar, and Matiari.

During the field day, Regional Director Engr. Hafiz Abdul Salam and Deputy Director Engr. Nazar Gul provided insights into various sugarcane sowing techniques employed at the DRIP research farm. The participating farmers actively engaged with the DRIP team, discussing water-saving methods and sharing their experiences with the new techniques.

Training Workshop on "Sun Satellite Approach for Farmers of Malva and KT Bandar"

PCRWR, in collaboration with Mehran University of Engineering and Technology (MUET) Jamshoro and the Australian Centre for International Agricultural Research (ACIAR), conducted a series of training programs on the Sun Satellite approach for farmers in Malva and KT Bandar during August and September 2023. The workshops were held at the Nawazabad site and the DRIP Research Farm in Tandojam.

The training was led by Engr. Hafiz Abdul Salam, Regional Director, and Engr. Nazar Gul, Deputy Director, alongside progressive farmers and master trainers who shared their expertise and practical experiences related to salinity and waterlogging management. The sessions included live demonstrations of the Sun Satellite model, which provided farmers with valuable insights into managing these critical agricultural challenges.
Participants received various dissemination materials, including brochures, backdrops, and standees, which complemented the hands-on training demonstrations. A total of 10 farmers from Malva, KT Bandar, and Jalapur engaged in the program, aimed at transferring knowledge and practical skills. To assess the effectiveness and impact of the training, feedback sessions were conducted at the Malva and KT Bandar sites, as well as for Jalapur farmers at the DRIP Research Farm, Tandojam. These sessions were crucial for evaluating the outcomes of the training and gathering insights for further improvements. The training program was significant in equipping local farmers with advanced techniques to address salinity and waterlogging, ultimately enhancing agricultural productivity and sustainability in the region.

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One day Field Training Program

PCRWR in collaboration with the Research & Development Foundation (RDF) organized a one-day field training program at the DRIP Tando Jam on March 7, 2024. The training aimed to educate farmers on best water management practices for cotton cultivation.

Around fifty male and female farmers participated in the program, where they received expert guidance from Engr. Hafiz Abdul Salam, Regional Director; Engr. Nazar Gul, Deputy Director; and Engr. Izhar Hussain Bhutto, Assistant Director. The session provided hands-on exposure to advanced techniques in water management, emphasizing strategies to enhance water efficiency in cotton farming.

Capacity Building Training Workshop in South Punjab

A series of four (04) day workshop on capacity building trainings was provided at District Bahawalpur in collaboration with UNICEF and Civil Engineering Department (IUB) under the project titled "Drought Disaster Preparedness and Management in Cholistan Desert". The basic idea behind these workshops were to develop the capacity of staff working under various Government and non-organizations and the promotion of "Knowledge sharing Culture". Lectures were delivered on "Sustainable Management of Groundwater Resources in South Punjab" and "Major contamination in water sources of South Punjab and its effect on human health with remedial measures". Trainees from various Government organizations, Academia and Non-Government Organizations attended this event.

Capacity Building Training for Water Quality and WASH Facilities

PCRWR, in collaboration with NRSP, has launched a training program for master trainers to enhance water conservation, quality, and hygiene practices. This initiative covers water-saving techniques, cleanliness, proper handwashing, and behavioral changes. It includes water quality monitoring in schools, disinfection of overhead tanks, and the installation of hand pumps in rural schools, with support from Help in Need. WASH committees are being formed to ensure safe water arrangements. A recent one-day training session at the NRSP office provided demonstrations on water sampling methods, field testing, and microbiological analysis, equipping NGO staff to manage water resources effectively in targeted communities

PCRWR Officials Attended Training Program on Enhancing Water Quality System

Officials from PCRWR attended a specialized training program on "Enhancing Water Quality System in Pakistan" at K-water Academy. Ms. Saiqa Imran, Senior Research Officer, Dr. Ghulam Murtaza, Senior Research Officer, and Mr. Shakeel Badhsah, Research Officer, along with other government officials from Pakistan, participated in the 49-day program held in Korea.

The training included 45 lectures, 12 workshops, 21 practical sessions, and 9 study visits to K-water's advanced facilities. As part of the Enhancing Water Quality Monitoring System to Achieve SDG 6 in Pakistan project, participants gained extensive knowledge and hands-on experience in water quality analysis, covering metals, ions, microbial tests, basic parameters, quality control, and sampling.

The program also involved developing Standard Operating Procedures (SOPs) and teaching materials, which were reviewed by K-water professionals. K-water will continue to support PCRWR officials in enhancing Pakistan's water quality monitoring and analysis capabilities.

Visits and Meetings

Visit of KOICA Delegation to PCRWR, Islamabad

On October 23, 2023, a delegation of Korean experts from the Korea International Cooperation Agency (KOICA) visited the PCRWR Headquarters in Islamabad. This visit was part of the project titled "Establishment of Groundwater Recharge/Rainwater Harvesting Ponds for Flood Prevention, Mitigation, and Preparedness in Multan and Muzaffargarh Districts, Punjab Province."

Dr. Hifza Rasheed, Director General of PCRWR, welcomed the delegation and provided a detailed briefing on PCRWR's current research activities and the advanced technologies and techniques developed by the organization. The Korean experts had the opportunity to visit several demonstration sites, including recharge wells, wetlands designed for wastewater treatment, and rainwater harvesting systems installed at PCRWR and Kachnar Park.

In addition to the headquarters visit, a joint team of PCRWR and Korean experts traveled to Multan and Muzaffargarh to assess the feasibility of installing rainwater harvesting ponds aimed at flood prevention. This collaborative effort underscores the importance of integrating international expertise and local knowledge to enhance flood mitigation and groundwater management in the region.

Chinese Delegation Visited PCRWR

In October 2023, a delegation from Henan University visited PCRWR as part of a PSF project on small-scale irrigation under climate change. The delegation toured PCRWR's headquarters and R&D farm, where they were briefed on ongoing research in water quality and conservation. The visit fostered potential collaboration and knowledge exchange between PCRWR and Henan University, aiming to improve water management practices in both countries.

Meeting with DevCon Pakistan

On September 15, 2023, a meeting was held at the PCRWR Regional Office in Karachi with the DevCon Pakistan team. The focus of the meeting was to discuss water treatment testing services provided by the PCRWR laboratory as part of a WaterAid-funded project. The discussions aimed to clarify the scope of testing services and ensure alignment with the project's objectives and requirements.

Visit of UN-Habitat Delegates to PCRWR, Lahore

On July 26, 2023, a delegation from the United Nations Human Settlements Programme (UN-Habitat) visited the PCRWR Regional Office, Lahore. Accompanied by representatives from Advanced Technologies for Recovery, who are developing environmentally friendly technologies in Lahore and Faisalabad, the delegation was introduced to various projects and initiatives.

The UN-Habitat team was briefed on the installation of reverse osmosis (RO) filter plants in underserved communities across Punjab. Mr. Faakhar Raza, Regional Director of PCRWR Lahore, provided an overview of PCRWR's activities and identified potential areas for mutual collaboration between PCRWR and UN-Habitat. The visit aimed to explore and enhance cooperative efforts in water resource management and sustainable technology development.

PCRWR Officials Visited Henan University, China

From August 15 to 27, 2023, a research team from PCRWR's Regional Office, Lahore, consisting of Mr. Faakhar Raza (Regional Director), Mr. Zia-ul-Haq (Deputy Director), and Dr. Habib-ur-Rehman (Research Officer), visited Henan University, China. The visit was part of a technical knowledge exchange program established between PCRWR and Henan University.

The primary aim of the visit was to foster closer cooperation in research and development, particularly focusing on scientific knowledge and technology transfer related to small-scale irrigation systems.

The delegation engaged in discussions with faculty and researchers at the Zhai Shiyan College of Geography and Environmental Science, exploring collaborative opportunities to advance irrigation technologies and practices in both Pakistan and China.

A delegation from UNICEF and Irrigation Department Visited PCRWR, Lahore

A delegation UNICEF and the Irrigation Department of Punjab visited the PCRWR Regional Office, Lahore. The primary focus of the visit was to explore and discuss potential collaboration on upcoming groundwater mapping and management projects throughout the Punjab province.

During the visit, the delegation engaged in identify key areas where joint efforts could be beneficial. The talks centered around enhancing groundwater management practices and implementing innovative solutions to address water resource challenges in Punjab.

Visit of UNICEF Water Expert to PCRWR, Islamabad

On October 26, 2023, Mr. Vijay Mitta, Water Expert from UNICEF Headquarters, visited the PCRWR Headquarters in Islamabad. Dr. Hifza Rasheed, DG, PCRWR, extended a warm welcome to Mr. Mitta and provided a comprehensive overview of PCRWR's initiatives in the fields of Water, Sanitation, and Hygiene (WASH) and groundwater recharge.

During the visit, Dr. Rasheed highlighted PCRWR's ongoing efforts to enhance groundwater recharge and promote traditional water conveyance systems, such as the Karez system. She elaborated on the innovative projects and initiatives undertaken by PCRWR, demonstrating various installations and technologies employed to address water management challenges.

This visit was an important opportunity for PCRWR to showcase its work and explore potential areas for collaboration with UNICEF in advancing water management and sustainability initiatives in Pakistan.

Winrock International Experts Visited PCRWR

On January 30, 2024, Ms. Jennifer Solakian, Senior Technical Lead of Winrock International, a U.S.-based organization, along with Mr. Ali Toqueer Sheikh, visited the PCRWR headquarters in Islamabad. The visit aimed to explore the strengths and mandate of PCRWR, with a view toward potential future collaborations.

Dr. Hifza Rasheed, DG, PCRWR, provided an informative presentation highlighting the council's research and development innovations and capacity-building initiatives. This was followed by a comprehensive discussion and Q&A session, where Winrock experts engaged with PCRWR professionals from the water quality, water management, and hydrology sections.

Director General, ICIMOD Visited PCRWR

On January 31, 2024, Dr. Pema Gyamtsho, Director General of ICIMOD, and his team visited PCRWR Headquarters, Islamabad. Dr. Hifza Rasheed, DG, PCRWR, presented organization's research, innovations, and capacity-building initiatives. Dr. Gyamtsho expressed strong appreciation and interest in collaboration. The team was also given a tour of PCRWR's water conservation and treatment models, showcasing technologies like Groundwater Recharge Systems and Rainwater Harvesting.

Delegation of WaterAid, Lasoona Relief & Development Organization Visited PCRWR

On May 7, 2024, PCRWR held a productive meeting with representatives from WaterAid, and Lasoona Relief & Development Organization. The meeting aimed to enhance collaboration on climate-resilient Water, Sanitation, and Hygiene (WASH) initiatives, zero liquid discharge, and rainwater harvesting.

During the discussion, PCRWR introduced its innovative technologies for drinking water treatment filters, particularly in flood-affected areas, as well as rainwater harvesting, groundwater recharge, and wetlands for wastewater treatment. This collaboration is expected to strengthen efforts toward sustainable water management and climate resilience in vulnerable communities.

Representatives of DePaul University Visit to PCRWR

On May 10, 2024, a delegation from DePaul University, including Mr. John Zeigler, Director of Urban Education & Community Partnerships, and Ms. Hiba Zakai, Ph.D. Scholar, visited PCRWR, Islamabad. The visit aimed to explore opportunities for exchanging ideas on promoting innovative urban solutions through community engagement.

Mr. John Zeigler expressed his appreciation for PCRWR's research and innovative work. Following the meeting, the DePaul University team was given a demonstration of PCRWR's water conservation and treatment models installed on the premises, including groundwater recharge systems, rainwater harvesting systems, the Hydra Ram Pump, a hand-operated floodwater treatment unit, and constructed wetlands for wastewater treatment.

Field Visit of UNICEF Team

On October 30, 2023, Regional Director, PCRWR, along with a team from UNICEF conducted a field visit to several locations in Sindh to explore solutions for brackish groundwater issues. The visit included assessments at Village Saleh Muhammad Goth in Bin Qasim Town, District Malir; Gulshan-e-Hadid Phase 2; Gharo (THQ Hospital) Taluka Gharo, District Thatta; and Makli (Urban Areas) Taluka Thatta, District Thatta. The aim was to understand the challenges and potential solutions for improving water quality in these areas.

Senior Advisor UNOPS Asia Region Visited, PCRWR

On May 20, 2024, Dr. Simonetta Siligato, Senior Advisor to the Regional Director of UNOPS Asia Region, visited PCRWR. Accompanied by Arshamah Jamil, Partnerships Specialist, and Wajid Ullah, Partnerships Senior Officer, Dr. Siligato met with Dr. Hifza Rasheed, DG, PCRWR, and Ms. Saiqa Imran, Director of Water Quality.

During the meeting, Dr. Hifza Rasheed provided an overview of PCRWR's programs, research accomplishments, and potential future collaborations. She also briefed Dr. Siligato on the support received from UNOPS and KOICA for enhancing the facilities of PCRWR's National Water Quality Laboratory (NWQL).

Following the discussions, Dr. Siligato was given a tour of the NWQL and demonstrations of the on-premises rainwater harvesting system and constructed wetlands for wastewater recycling. The visit highlighted the ongoing efforts and collaborations aimed at advancing water quality research and management.

Visit of Officers from Agriculture Department Punjab

On September 5, 2023, officers from the Agriculture Department's Water Management Wing and Planning & Evaluation Cell visited PCRWR's Regional Office in Lahore as part of their training program. The visit aimed to familiarize them with PCRWR's projects and research activities.

Regional Director Mr. Faakhar Raza provided a detailed overview of the water scenarios and challenges faced in Pakistan, supported by the groundwater atlas of the Indus Basin and its quality trends. He discussed various rehabilitation options, including the design and application of recharge wells and rainwater harvesting systems, as well as the methodologies and outcomes of recent PCRWR projects.

The officers expressed significant interest in PCRWR's research activities and commended the organization's efforts in addressing water management issues and promoting water-saving techniques.

Representatives of Fatima Fertilizer Limited Visited PCRWR

On August 30, 2023, representatives from Fatima Fertilizer Limited, Sheikhupura, visited the PCRWR Regional Office, Lahore to discuss water accumulation issues at their agricultural sites due to excess rainfall. PCRWR's research team visited three sites cultivating rice, wheat, and fruits. Site 3, a 70-acre plot, faced severe waterlogging from a clayey top layer and salinity, making the land uncultivable. PCRWR recommended installing a recharge well and storage pond to manage the excess water, submitting a detailed proposal to Fatima Fertilizer for review.

Exposure Visit of Green Urban Development Participants to PCRWR, Islamabad

On March 25, 2024, fifteen students from COMSATS University, Islamabad, accompanied by Dr. Tairq Ejaz, Senior Fellow at the Institute of Urbanism, visited PCRWR Headquarters as part of the Green Urban Development initiative. The visit aimed to provide students with practical insights into PCRWR's approaches to green urban development.

Engr. Muhammad Dilshad Arshad, Director (Hydrology), gave a presentation on PCRWR's research activities related to rainwater harvesting, groundwater recharge, and other developed interventions. Additionally, Engr. Syed Ibtisam Asmat, Deputy Director (Groundwater), demonstrated artificial recharge techniques at Kachnar Park. This state-of-the-art site features a complete monitoring system, including piezometers and CTD divers. Since June 14, 2022, approximately 12 million gallons of water have been recharged at this site, resulting in a 0.15-meter rise in the water table and a 0.2 dS/m improvement in groundwater quality.

Visit of Sr. Joint Secretary, MoWR to PCRWR

On May 22, 2024, Syed Mujtaba Hussain, Sr. Joint Secretary (Administration), MoWR, along with Deputy Secretary Saleem Ahmad Khan, visited PCRWR. Dr. Hifza Rasheed, Director General, provided an overview of PCRWR's activities, achievements, and ongoing projects related to water issues and climate change. The delegation toured various PCRWR facilities, including the National Water Quality Lab, Rainwater Harvesting model, Groundwater Recharge systems, and Wastewater Treatment plant. The Sr. Joint Secretary expressed interest and appreciation for PCRWR's initiatives and their alignment with the National Water Policy.

Deputy Secretary (Budget), MoWR Visit to PCRWR

From May 20 to 21, 2024, the Deputy Secretary (Budget) of the Ministry of Water Resources conducted an audit at PCRWR's Regional Office in Lahore. Engr. Faakhar Raza, Regional Director, led the meeting with the research team, providing a detailed overview of ongoing and recent projects. The Deputy Secretary expressed appreciation for the work done and offered constructive suggestions for further improvement.

Meeting with Sindh Environmental Protection Agency

On September 20, 2023, a meeting was held at PCRWR Regional Office, Karachi with the Sindh Environmental Protection Agency (SEPA) team. The purpose of the meeting was to explore potential research collaborations between PCRWR and SEPA, focusing on environmental monitoring and mitigation efforts in Sindh. The discussions centered on identifying joint research opportunities and strategies to address environmental challenges in the region.

Visit by RDF Officials and Farmers to PCRWR

On June 26-27, 2024, officials from the Research and Development Foundation (RDF) and a group of farmers visited the R&D Farm, DRIP-PCRWR, in Tando Jam. During the visit, DRIP professionals provided a comprehensive demonstration and briefing on the ongoing research and development activities at the facility.

PTV and PCRWR Teams Visited Manchar Lake

On February 15, 2024, a joint team from Pakistan Television Corporation (PTV) and the Pakistan Council of Research in Water Resources (PCRWR) visited Manchar Lake. The purpose of the visit was to collect water samples and support the production of a documentary on the ecological degradation of the lake. The documentary, produced by PTV, featured PCRWR's research on the contamination of Manchar Lake by pollutants and investigated the causes of this environmental issue.

Collaborations

Program of Cooperation (PoC) Between PCRWR and NUST

On March 29, 2024, Pakistan Council of Research in Water Resources (PCRWR) and the Research, Innovation & Commercialization (RIC) department of the National University of Sciences and Technology (NUST), Islamabad, formalized their collaboration through a Program of Cooperation (PoC). The agreement aims to bolster research and innovation in the water sector.

The PoC outlines a commitment to collaborative projects and initiatives focused on high-quality research and innovation in water management, water quality, and water security. Under this partnership, NUST will offer technical support, including research data and analysis, while both institutions will work together on joint proposals and publications. The agreement was signed by the Pro-Rector of NUST and the Director General, PCRWR.

Signing of Agreements with PDA Peshawar, Secure Islamic France (SIF), and International Rescue Committee (IRC)

Pakistan Council of Research in Water Resources (PCRWR), Peshawar, has signed several key agreements to enhance water resource management and safe drinking water provision. On May 27, 2024, PCRWR signed an agreement with the Peshawar Development Authority (PDA) to facilitate the exchange of knowledge, information, research, and literature for ensuring safe drinking water at the community and household levels.

On November 3, 2023, PCRWR entered into an agreement with Secure Islamic France (SIF) Peshawar, focusing on the provision of safe drinking water, irrigation solutions, rainwater harvesting techniques, and groundwater resource assessment.

Additionally, on August 23, 2024, PCRWR signed an agreement with the International Rescue Committee (IRC) Peshawar to implement interventions aimed at climate-resilient WASH initiatives. This includes planning and conducting feasibility studies to assess the water table, piloting groundwater recharge, and rainwater harvesting.

MoU Signed with US-Pakistan Center for Advanced Studies in Water

Engr. Hafiz Abdul Salam, Regional Director, DRIP-PCRWR, signed a Memorandum of Understanding (MoU) with the US-Pakistan Center for Advanced Studies in Water at Mehran University of Engineering and Technology, Jamshoro, Sindh, Pakistan. This agreement is part of the project titled "Transformation through Adoption of Trees and Shrubs for Salinity Management in the Southern Indus Basin, Pakistan (WAC/2021/136)." The MoU outlines the provision of research services aimed at addressing salinity issues in the region through innovative solutions involving trees and shrubs.

Services

Water Quality Testing and Analysis

National Water Quality Laboratory of PCRWR is one of the state of the art Laboratories of Pakistan with high tech water testing equipment and well trained professional. It is ISO-17025:2017 accredited Laboratory. The provision of water and wastewater testing and advisory services to the general public and public and private organizations is a continue activity. NWQL is also executing the ground water, surface water as well as wastewater assessment and monitoring projects of government and or with collaboration of national and international organizations.

Groundwater Investigations

PCRWR has a fully trained team equipped with latest tools and equipment for groundwater investigations. Usually, Electrical resistivity surveying methods have been widely used to determine the thickness and resistivity of layered media for the purpose of assessing groundwater potential and drilling boreholes in fractured unconfined aquifers.

Laser Land Leveling

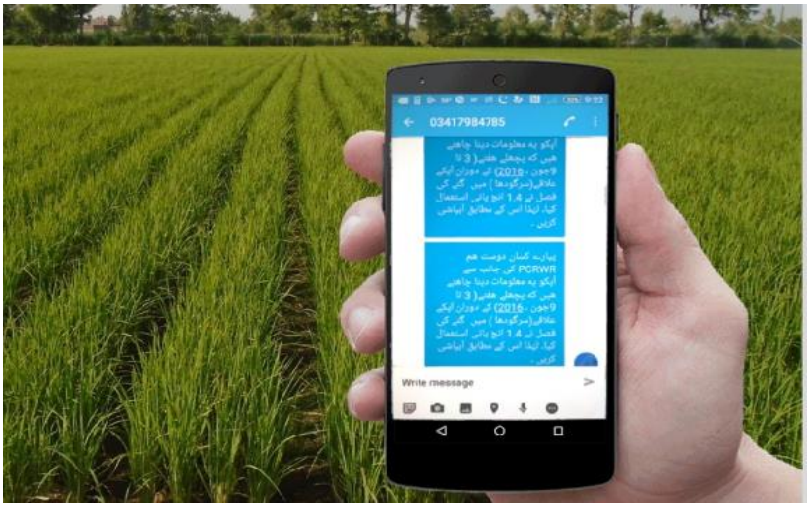
Laser Land Leveling is a process of smoothening the land surface from its average elevation with a certain degree of desired slope using a guided laser beam through-out the field. Laser leveling of agricultural land is a recent resource-conservation technology. The Research and Demonstration Farms of PCRWR are equipped with the latest Laser Land Levelers and the services are provided to the farmers on their request.

Soil Testing Service

PCRWR has maintained a state of the art soil physics laboratory at its headquarters. Soil testing is an important diagnostic tool for determining the nutrient needs of plants and for environmental assessments. The major laboratory testing includes soil moisture percentage, organic matters in soil, soil moisture retention curves, soil moisture extraction for chemical analysis. PCRWR soil physics laboratory is unique in Pakistan providing all above mentioned tests under one roof.

Irrigation Advisory Services

PCRWR launched the service on April, 2016, which is an outcome of international collaboration extended by the University of Washington (UW) and NASA. The SMS based Irrigation Advisory Services of PCRWR are being provided free of cost to about 20,000 farmers on weekly basis in 41 districts of Pakistan. However, PCRWR envisions extending the service to all farmers of irrigated areas, through international and national coordination.



Research Publications

Research Publications

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