

# PCRWR

ANNUAL  
REPORT 2020-21



**Pakistan Council of Research in Water Resources (PCRWR)**

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Pakistan Council of Research in Water Resources  
(PCRWR), Khayaban-e-Johar, H-8/1, Islamabad.



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REPORT 2020-21**

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Khayaban-e-Johar, H-8/1, Islamabad  
Tel: +92-51-9101282-83, Fax: +92-51-9101280  
E-mail: [pcrwr@isb.comsats.net.pk](mailto:pcrwr@isb.comsats.net.pk)  
Website: [www.pcrwr.gov.pk](http://www.pcrwr.gov.pk)

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# *FOREWORD*

Pakistan water resources are under immense pressure due to the ever-increasing population, urbanization and agricultural activities. Climate change has further aggravated the situation resulting in frequent droughts and floods. For the last few years, urban flooding has become a common phenomenon. This is mainly due to reduction in vegetative cover in the catchment areas, conversion of grassy lands into metaled roads and concrete thereby increasing the runoff volume and intensity, and reducing the lag time. Moreover, the encroachments in the drainage channels have magnified the issue.

On one hand, this huge rainwater is becoming a nuisance but on the other hand, the groundwater is depleting in almost all the urban centers. To reduce urban flooding and increase recharge, it is important to improve the vegetative cover by planting trees and grasses in the catchments. This would help the slow release of water thereby reduce the chances of urban flooding. Moreover, it would help recharge the groundwater aquifer. Moreover, rainwater from rooftops, pavement, parks, roads etc. needs to be harvested for its direct use or for recharging the groundwater aquifers. This would also accomplish the Government of Pakistan initiative "Recharge Pakistan Program". Pakistan Council of Research in Water Resources (PCRWR) has developed simple and smart rainwater harvesting and groundwater recharge techniques that are now being adopted by various development agencies such as Capital Development Authority (CDA) and Rawalpindi Chamber of Commerce and Industry. However, there is a need to take up these technologies on a larger scale.

Similarly, water resources need to be managed in all sectors and at all scales, for example, surface and groundwater management for agriculture use, fair and just distribution of water among the provinces, drinking water quality management, rainwater harvesting in the dry areas etc. All these require scientifically reliable data for an informed decision of the planners and the policymakers. PCRWR in collaboration with its national and international partners has generated huge data sets on the above-mentioned issues along with piloting some of the interventions. The report will provide you an insight into the Council's collaborative efforts to address some of the emerging water issues in the country.

Dr. Muhammad Ashraf  
Chairman, PCRWR



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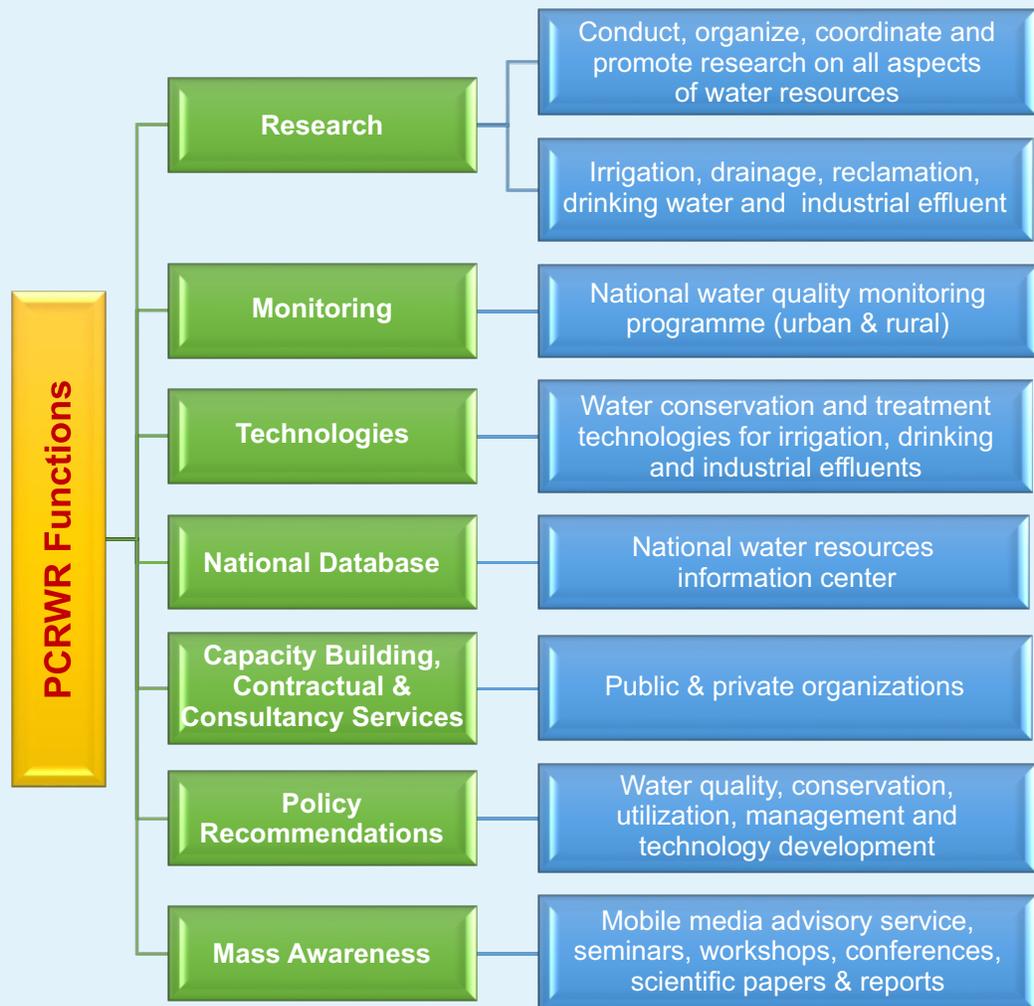
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# **About PCRWR**



Pakistan Council of Research in Water Resources (PCRWR) is an apex organization of the Ministry of Science and Technology (MoST) established through Act of Parliament 2007. It is mandated to conduct, organize, coordinate and promote research on all aspects of water resources. The functions assigned to PCRWR are given below:



## Vision

To carve knowledge products befitting the needs of water resources management

## Mission

Creation of enabling environment for inclusive and adaptive research in water resources management

# 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:*

- Headquarter in Islamabad with eight regional offices: Tandojam, Quetta, Bahawalpur, Lahore, Peshawar, Karachi, Muzafarabad and Gilgit
- Water testing laboratories in 24 cities: 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 centres in different agro-climatic zones of the country.
- GIS and Geo-hydrological laboratory, Islamabad
- Information and documentation Centre, Islamabad
- Drainage type lysimeters: Tandojam, Lahore, Quetta and Peshawar
- Soil Physics Laboratory, Islamabad



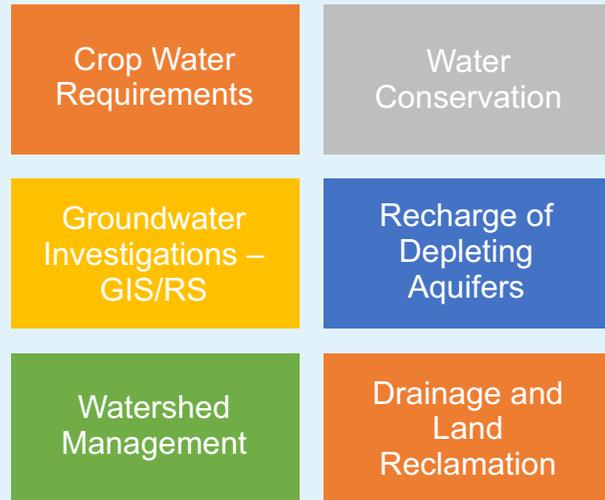
# Major Research Areas

*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, Drinking Water Policy etc.*



## Water Management



## Rainwater Harvesting and Desertification Control



## Water Quality



## Budget for the year 2020-2021

The budget for PCRWR comes from various sources

- Government of Pakistan - development budget (PSDP projects) and non-development budget (salaries and other operational expenses)
- Earnings from its services - water quality testing, laser land levelling, ERS survey for groundwater investigations, consultancy services etc.
- Donor assisted projects - most of the research activities have been conducted with the partnership of National and international organizations.

PCRWR in collaboration with SIDA (Sindh Irrigation and Drainage Authority) is executing a project “Groundwater Investigation and Mapping in Sindh” to analyze groundwater quality, spatial variation in depths of groundwater and identification of fresh groundwater pockets.

PCRWR in partnership with NIO (National Institute of Oceanography) conducting a study on “Monitoring the Sea Water Intrusion, Sea Level Rise, Coastal Erosion & Land Subsidence along with Sindh and Balochistan Coast” to assess the seawater intrusion along the coastal zones of Pakistan.

(Rs. in million)

Type	Sanctioned	Released	Expenditure
Non-development	464.246	464.246	464.246
Development	20.337	20.337	20.337



# **Key Achievements/ Activities**



# Launch of the UN World Water Development Report 2020: Groundwater Investigations and Mapping in the Lower Indus Plain and Consultation for Development of Groundwater Management Plan for Pakistan

PCRWR in partnership with UNESCO Islamabad, The Asia Foundation, the United States Agency for International Development (USAID) and the International Water Management Institute (IWMI) launched two reports on 30<sup>th</sup> September, 2020. The launch was followed by a stakeholder consultation for the development of the “Groundwater Management Plan” for Pakistan. The consultation was aimed to help the Government of Pakistan with the long-term management of groundwater resources. Chaudhry Fawad Hussain, Federal Minister for Science and Technology in his remarks said that the present government had substantially increased the water resources development budget of the country. Ms. Patricia McPhillips, UNESCO Representative in Pakistan, Dr. Muhammad Ashraf, Chairman, PCRWR, Mr. Muhammad Nawaz, USAID and Mr. Farid Alam, Director Programs, The Asia Foundation spoke on different aspects of water and climate change.



*Chaudhry Fawad Hussain, Minister for Science and Technology speaking on the occasion*



*Ms. Patricia McPhillips, UNESCO representative addresses on the occasion*



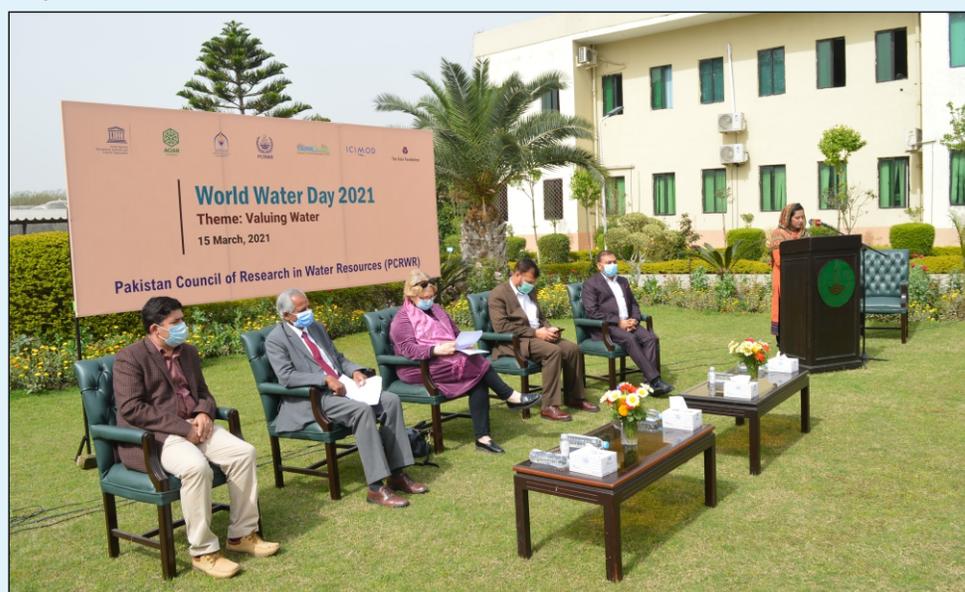
*Group photo of the participants*

PCRWR in collaboration with the UNESCO Pakistan Office, Australian Centre for International Agricultural Research (ACIAR), Riphah Institute of Public Policy, The Asia Foundation, ICIMOD and Technology Times celebrated the World Water Day on March 15, 2021 at PCRWR Headquarter, Islamabad. This year's theme of World Water Day was “Valuing Water”.

Chief Guest of the event, H.E. Dr. Jeoffery Shaw, Australian High Commissioner addressed audience and mentioned long- term partnership of Australian and Pakistan governments in water sector. Speaking on the occasion UNESCO Country Director, Ms. Patricia McPhilips said that it was encouraging to see the involvement of young people in water resources education. Speaking on the occasion Dr. Muhammad Ashraf, Chairman PCRWR remarked that it was high time to recognize the value of water to preserve it for our future generations. Mr. Farid Alam, Director Programs, The Asia Foundation; Mr. Muhammad Ismail, Country Representative ICIMOD; and Syed Paras Ali, Editor in Chief Technology Times also addressed the audience.

PCRWR Regional Offices at Lahore, Karachi, Bahawalpur, Quetta, Peshawar and DRIP, Tandojam organized events to celebrate World Water Day, 2021. PCRWR Water Quality Laboratories also organized events for the celebrations of the day.

On this occasion, lectures on theme valuing of water were delivered in schools, tree plantations and walks were arranged to create awareness on water related issues and future water challenges. Government officials, students, social workers and representatives of the corporate sector participated by carrying colorful banners on importance of water.



*Photo of the guests on World Water Day 2021*

# Celebration of World Water Day 2021



**One Day Webinar on "Valuing Water" on 22nd March, 2021 (World Water Day)**

**Objectives:**

- Frame the opportunities for valuing water to address global challenges.
- Understand the drivers, barriers and opportunities for new financial models and allocation systems in Pakistan.
- Establish priorities and strengthen partnerships in design, test and scale-up new and existing approaches.

**Speakers:**

 <b>Dr. Zameer Ahmed</b> Senior (Water Resource Management Services (WRMS))	 <b>Dr. Hina Rashid</b> (National Water Quality Research)	 <b>Abdul Aziz Khuram</b> (Senior Water Care Services Business partner (PCRWR)-13)	 <b>M. Asma Keyes</b> (Chief Executive Officer, at Pakistan Research Society)	 <b>Prof. Dr. Robina Farooq</b> Vice-Chancellor, GCWU/F Patron, In-Chief PCRWR-13 (Development of Intergovernmental, user-friendly Water Alert Test Kit to detect harmful bacteria)
 <b>Dr. Zia I. Hameed</b> Coordinator	 <b>Dr. Ahsan Kausar</b> Chief Organizer	Organized by: Department of Chemistry, Govt. College Women University, Faisalabad in collaboration with PCRWR.		Date: 22nd March, 2021



World Water Day Celebrations at PCRWR Regional offices: Lahore, Bahawalpur, Tandojam, Karachi, Quetta, Gilgit, and Water Quality Laboratories in these regions

## 6<sup>th</sup> International Water Conference 2020

Pakistan Council of Research in Water Resources (PCRWR) in partnership with Riphah International University (RIU), The Asia Foundation (TAF) and Pakistan Institute of Development Economics (PIDE) jointly organized a two day 6<sup>th</sup> International Water Conference on 29-30 December, 2020. Key thematic areas of the conference were; Water for all (Water, Food and Energy Nexus), H<sub>2</sub>O Podcast, Blue Economy, Water and Environment.

During the inaugural session, the Chairman Federal Flood Commission, Mr. Ahmad Kamal was the chief guest. Speaking on the occasion, he said that generating knowledge, awareness and knowledge management was crucial for water resources management in the country. The Chairman PCRWR, Dr. Muhammad Ashraf stressed on the importance of setting research priorities according to the issues at hand, which is water scarcity and prevailing scenario of inefficient utilization of water resources. The Deputy Vice Chancellor, RIU, Prof Dr. Saad Nadeem Zafar stressed on the modernization of water resources management through application of Artificial Intelligence (AI) and Internet of Things (IoT). The Acting Vice Chancellor, PIDE, Prof. Dr. Durr-e-Nayab highlighted unfair water pricing, virtual water trade and the state of under-utilized “Blue Economy” of Pakistan. Mr. Farid Alam, Director Programs, TAF, highlighted the importance of Water, Energy and Food nexus in the context of climate change.

The inaugural session was followed by virtual presentation sessions involving 62 presenters, mainly Master and PhD students from higher education institutions of Pakistan. Social media campaign on twitter was also launched with #Water4life which remained top twitter trend.



*Chairman FFC and Chairman PCRWR speaking on the occasion*

## Dialogue on Fostering Trust amongst Pakistan's Water Institutions in Data Measurement and Monitoring at Islamabad

Pakistan's water sector faces multi-faceted challenges. Managing the Indus Basin Irrigation System needs rethinking and meaningful partnership of stakeholders across the provinces. Fostering trust amongst the water institutions of Pakistan is essential to complement the investments in telemetry and similar technologies. PCRWR in partnership with IWMI (International Water Management Institute) had previously organized two rounds of countrywide dialogues in 2017 and 2018 with the themes of Water Appointment Accord and Indus Telemetry-Delivering on the National Water Policy. One of the consensus points through dialogues was improving the water accounting using automated flow measurement.

In this regards, PCRWR and IWMI organized country-wide series of dialogues attended by the water professionals. These dialogues were held on 8<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup> and 16<sup>th</sup> December, 2020 at Quetta, Tandojam, Lahore and Peshawar respectively. The plenary session of the dialogue was held on 28<sup>th</sup> December, 2020 at PCRWR, Islamabad. The dialogues were aimed to discuss data generation, management, sharing mechanism and monitoring of water resources through scientific tools to minimize the deficit of trust found amongst the major stakeholders. Participants included members of Indus River System Authority (IRSA), Federal Flood Commission (FFC), and provincial Irrigation Departments of the four provinces.



*Photo of participants during the dialogue*

## Seminar on Water Resources Management & Climate Change

A seminar on Water Resources Management and Climate Change was organized at DRIP campus, Tandojam on 28th October, 2020. The Commissioner, Hyderabad division inaugurated the seminar as the Chief Guest. The seminar was jointly organized by Pakistan Council of Research in Water Resources (PCRWR), Society of Economic Geologists and Mineral Technologists (SEGMITE), Water, Minerals & Environmental (WME) Consultants and Pakistan Science Foundation (PSF). More than hundred professionals, scientists, researchers, academia and stakeholder organizations attended the seminar. Thirteen Research articles/papers were presented by the experts from different organizations and academia on water resources management, climate change and its impacts.



## Seminar on Delivering National Water Policy in KP-Flow Monitoring in Canals

Pakistan Council of Research in Water Resources in collaboration with International Water Management Institute (IWMI) organized a one-day seminar titled “Delivering on the National Water Policy in KP-Flow Monitoring in Canals” under USAID funded Water Management for Enhanced Productivity (WMFEP) activity on August 21, 2020. The seminar was aimed to discuss and seek consensus on the best practices for canal flow measurement in KP. The seminar facilitated discussions amongst the stakeholders on the important topics of type of technology for flow measurement and the institutional role.



## Training Workshop on Cultural Mapping in the Context of Karez Cultural Landscape

Pakistan Council of Research in Water Resources (PCRWR), United Nations Educational, Scientific and Cultural Organisation (UNESCO) and Rogers Kolachi Khan and Associates (RKK) organized a 3-day training workshop on Cultural Mapping in the context of Karez Cultural Landscape on October 19-21, 2020 at BUIITEMS, Quetta. The training participants included representatives from various Balochistan Government organizations; Department of Culture, Tourism and Archives, On Farm Water Management Department, Agriculture Department, Agricultural Extension Department, Balochistan Rural Support Program, Forest Department and students from Archeology and Anthropology Departments, University of Balochistan and BUIITEMS, Quetta. During the closing ceremony of the workshop, Dr. Muhammad Ashraf, Chairman, PCRWR interacted with the participants of the training and listened to the key messages they had received during the training workshop. Speaking on this occasion, Ms. Patricia McPhilips, Director, UNESCO, Pakistan stressed on the importance of the integration of Science and Culture. Mr. Abdul Rehman Langho, Director, Archaeology, Department of Culture, Tourism and Archives, remarked that Balochistan was full of archaeological heritage and Karez water system was a part of it.



*A glimpse of the training workshop*



*Group photo of the seminar participants*

### **3<sup>rd</sup> Steering Committee Meeting regarding Possible Nomination of Karez Cultural Landscape of Balochistan**

The 3<sup>rd</sup> Steering Committee meeting was Chaired by the Additional Secretary (Culture), Mr. Abdul Manan, Government of Balochistan on 22<sup>nd</sup> October, 2020 at Quetta. The participants of the meeting included:

Dr. Muhammad Ashraf, Chairman, PCRWR, Ms. Patricia McPhilips, Director, UNESCO, Dr. Manzoor Hussain Somroo, President, ECO Science Foundation, Mr. Abdul Wahab, Director, OFWM (Balochistan), Mr. Shoaib Nadeem Tareen, Director, Irrigation Department, Dr. Abdul Mauntaqim Naji, Head (Geology Department), BUITEMS, Syed Muhammad Waseem, Assistant Chief (Culture), P&D Department, Dr. Tahir Saeed, Deputy Director, Department of Archaeology and Museum and representatives from Forests and Wildlife department, Environmental Protection Agency, Balochistan Rural Support Program (BRSP), and Rogers Kolachi Khan and Associates. The meeting was intended to discuss the ongoing progress on nomination process of Karez Cultural Landscape of Balochistan.



*Participants of the Steering Committee Meeting at Quetta*

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

A meeting of Pakistan National Committee on Intergovernmental Hydrological Programme of UNESCO was organized at PCRWR Headquarters, Islamabad on 19<sup>th</sup> November, 2020. The meeting was Chaired by Convener of the Committee, Dr. Muhammad Ashraf, Chairman, PCRWR.

Total 35 participants from the member and stakeholder organizations participated in the meeting and consultation session. The Chairman, PCRWR in his opening remarks welcomed all the participants and shared the progress on PNC-IHP during the year.

Ms. Patricia McPhilips, Director, UNESCO, appreciated the progress of PCRWR and assured of UNESCO's full cooperation. Mr. Ahmad Kamal, Chairman, Federal flood Commission also appreciated the progress on IHP and offered to join hands with PCRWR in groundwater investigation activity. Ms. Saba Saleemi, Assistant Secretary General, PNCU-UNESCO briefed about the progress of cases submitted to UNESCO, Paris.



*Group photo of the participants*

## Consultation Workshops and Trainings on IWRM Guidelines

PCRWR organized a series of Consultation Workshop and Trainings on Integrated Water Resources Management (IWRM) Guidelines in all the provinces of Pakistan during the year. The first national level consultation workshop was held on 19<sup>th</sup> November, 2021 at Islamabad. In this consultation session, a draft IWRM Implementation Guidelines for Pakistan was presented by PCRWR to discuss and receive feedback of the experts to develop a document on IWRM under UNESCO's Guidelines for IWRM implementation at River Basin Level.

In this regard, six more workshops at provincial level were organized on 9<sup>th</sup>, 10<sup>th</sup>, 17<sup>th</sup> February, 2021 at Karachi, Hyderabad, Peshawar and on 8<sup>th</sup>, 10<sup>th</sup>, 22<sup>nd</sup> March, 2021 at Lahore, Bahawalpur and Quetta respectively. The professionals and scientists from academia, provincial departments and stakeholder organizations attended the workshops.



*Group photos of participants*

## Inter University Water Resource Mapping with GIS Application Competition

PCRWR in collaboration with UNESCO organized a competition among university students for submitting short research studies proposals on region specific topics. The core objective of these studies is to figure out viable solutions of hot issues being faced in different regions of Pakistan through geospatial technology in relevance with World Water Day. About 32 research proposals were received by the students against their respective provincial topic. Three research students for water resources mapping research were shortlisted after comprehensive peer review of these research proposals. After successful submission of their research work, students were given shields and certificates on March 15, 2021 at the occasion of World Water Day.



*Ms. Maryam Khan, receiving shield for 1<sup>st</sup> position*



*Mr. Saleem Munawar receiving shield for 2<sup>nd</sup> position*



*Ms. Fariha Ansari receiving shield for 3<sup>rd</sup> position*

## EssayCon Essay Competition among Youth

PCRWR in collaboration with The Asia Foundation and Technology Times organized an essay competition among high school and undergraduate university students. Theme of the essay was to elaborate water related issues and their solution. About 82 students from different universities, colleges and schools submitted essays for the competition. Top three essay writers were rewarded with cash prizes and certificates on March 15, 2021 at the occasion of World Water Day 2021.



*Mr. Arsalan receiving shield for 1<sup>st</sup> position in Essay Competition*



*Ms. Aleena Shahid receiving shield for 3<sup>rd</sup> position in Essay Competition*

## Capacity Development Workshop on River Profiling and Discharge Measurement

PCRWR in collaboration with International Water Management Institute (IWMI) organized a workshop on river profiling and discharge measurement with ADCP on March 1-3, 2021 at its Headquarters in Islamabad. The objective of peer-to-peer learning was to provide an opportunity for water professionals across Pakistan to learn from each other. The training consisted of one-day lecture and two-days field training on River Kabul and River Swat in Khyber Pukhtunkha (KP).



*Participants of training workshop*

## Dialogue on Sindh and Balochistan Water Issues

PCRWR in collaboration with IWMI, Pakistan organized a dialogue on “Sindh and Balochistan Water Issues” on 20<sup>th</sup> August, 2020 at PCRWR, Islamabad. The dialogue was focused on specific inter-provincial water issues between the provinces of Balochistan and Sindh with an effort to build a consensus leading to an agreement between the provinces on some of the contentious issues regarding Pat Feeder and Kirther Canals. The dialogue was attended by the leading water experts of stakeholder organizations from Sindh and Balochistan.



*Photo of the participants during the discussion*

## Adopt a School Programme

PCRWR headquarters, Islamabad and all its 24 outfits have adopted two schools each under adopt a school program throughout Pakistan. PCRWR is managing Water, Sanitation and Hygiene (WASH) activities in these schools by providing regular water quality monitoring, water filtration plants, cleaning of water reservoirs, up-gradation of water supply infrastructure, and construction of inverted wells for groundwater recharge at selected schools.



*PCRWR team meets with school administration for Adopt a School programme in Gilgit*

## Two Days Training Workshop on “Drinking Water Quality Treatment”

PCRWR in collaboration with Mojaz Foundation, Water Aid and PepsiCo organized a two-days training workshop on “Drinking Water Quality Treatment and related Testing” on February 15-16, 2021. Total 35 participants from water user committees, members of Humak, Saidpur, tube well operators and school staff were trained on drinking water treatment. The workshop was aimed to improve the participants knowledge on water quality testing and treatment methods.



*Chairman PCRWR addressing the audience*



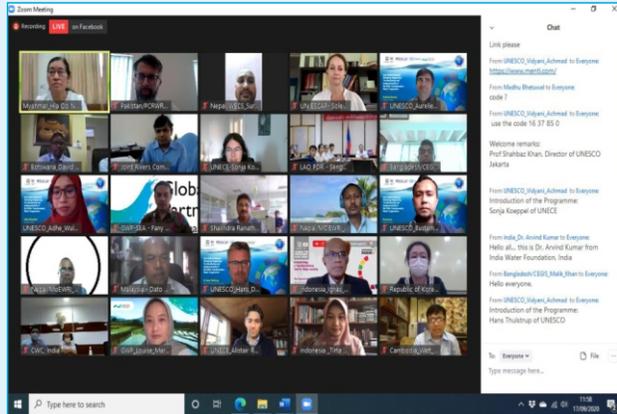
*Director Water Quality imparting training*



*Group photo of the participants*

## Open Science Regional Consultation Meeting for Asia Pacific Region

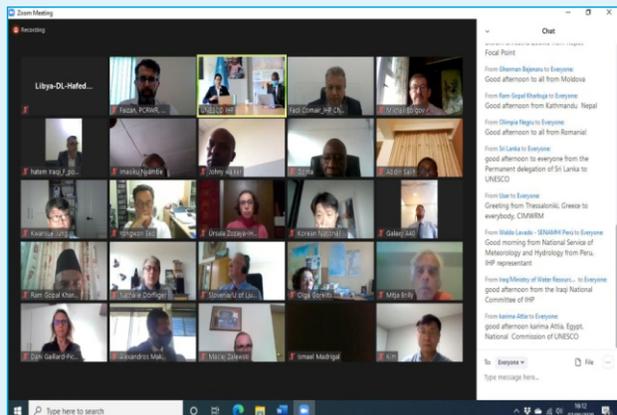
UNESCO, Jakarta arranged an open Science Regional Consultation Meeting for Asia Pacific Region on 15<sup>th</sup> September, 2020. Mr. Faizan ul Hasan, Director, and Ms. Bareerah Fatima, Programme Liaison Officer, PCRWR virtually participated in the meeting. The meeting was part of regional consultations aimed at building a global consensus on Open Science by gathering inputs from Asia Pacific scientists and other stakeholders.



Screenshot of meeting participants

## Meeting of Intergovernmental Hydrological Programme (IHP) Council Members and Observers

A virtual meeting of Intergovernmental Hydrological Programme (IHP) Council Members and Observers was held on 4<sup>th</sup> September, 2020 in Paris, France. The meeting was in pursuance of preparation of next ten-year agenda. Mr. Faizan ul Hasan, Director, PCRWR attended the meeting as representative of IHP-Pakistan. In total 168 participant of member countries attended the meeting.



Screenshot of meeting participants

## Water Quality Monitoring in Tehsils Hasilpur and Chishtian

Pakistan Council of Research in Water Resources (PCRWR) and National Rural Support Programme (NRSP) have jointly undertaken the water sampling under the project “Water, Immunization, Sanitation and Education Indicator Improvement” (WISE) launched by NRSP in Tehsil Hasilpur and Chishtian. In total, 550 public water sources including hand pumps, injector pumps, water supply schemes and filtration plants were monitored for water quality. Only 38% water sources were found safe. For the awareness of local community, the sources safe for drinking purpose were marked with green

whereas unsafe sources were marked with red color.



*Hand pump colored green to indicate safe drinking water source*

## Piloting Climate Smart Aquaculture in Tharparkar for Local Food Security

Pakistan Council of Research in Water Resources (PCRWR) with the financial assistance of The Asia Foundation (TAF) executed the construction of saline fish pond at PCRWR R&D Centre, Mithi, Tharparkar. The aim of the activity is to promulgate food security options in Mithi through aquaculture and effective use of land and water resources demonstrating the impacts of fish farming on the local community. The saline fish pond will act as pilot to establish entrepreneurship for local vendor and low cost, high quality food source for the local population.



*Newly constructed pond for saline fish farming*

## Installation of Water Filtration Plants at Quaid-i-Azam University

Two water filtration plants having capacity of 2500 liters per hour have been installed on 3<sup>rd</sup> and 10<sup>th</sup> December, 2020 at Girls and Boys Hostels of Quaid-i-Azam University, Islamabad under the supervision of PCRWR. The plants are donated by QAU Alumni Association, will facilitate more than 1800 students and local residents.

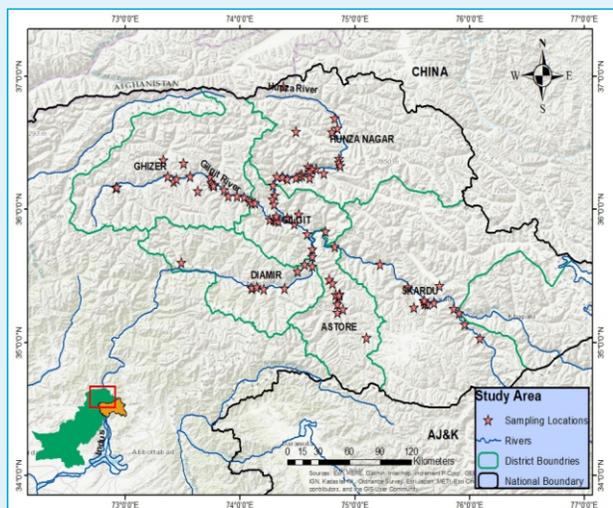


PCRWR team with VC QAU

## Water Quality Survey in Gilgit-Baltistan

Gilgit-Baltistan is house of world's second highest mountain peak surrounded by more than 7000 glaciers. The snow and glacial resources of the Himalayan region are a major source of fresh water for the Indus basin irrigation system on which sustenance of millions of people depend. Therefore, it is known as the water tower of Pakistan. Considering the long term health implications associated with water quality, PCRWR in collaboration with The Asia Foundation has conducted water quality assessment survey of rivers, lakes and springs of six districts of Gilgit-Baltistan i.e. Skardu, Ghizer, Gilgit, Hunza, Astore and Diamer. A high percentage of samples (67%) collected

from various sources indicated the presence of microbial contamination.



Map of water quality sample collection points

## Comparison of Discharge Measurements at Different Rivers of Khyber Pakhtunkhwa

A study was undertaken in July, 2020 by PCRWR to compare results between Acoustic Doppler Current Profiler (ADCP) and Velocity Radar Sensor (VRS) for flow measurement on the request of KP Irrigation Department. The observations were made using ADCP on 7 different sites in Khyber Pakhtunkhwa where velocity radar sensors had already been installed by the KP Irrigation Department. The work was presented in a meeting on 20<sup>th</sup> August, 2020. This work was greatly acknowledged by the experts.



*PCRWR team measuring flow using ADCP*

## Establishment of Research Information Cell in Gilgit

A Research Information Cell (RIC) has been established in collaboration with The Asia Foundation and Karakoram University at PCRWR's Gilgit Water Quality Laboratory. This cell will provide facilitation to research students at KU. Research publications of PCRWR and other organizations have been arranged and proper catalogue is being maintained to provide the facilitation to the research students.



*Research Information Cell at PCRWR Lab. Gilgit*

## Implementation Status of Interventions in Water Sector (Provision of Safe Drinking Water by Chlorination), Proposed by the Prime Minister's Innovation Task Force

PCRWR and Metropolitan Corporation Islamabad (MCI) have jointly undertaken the sampling of water supply in Islamabad at source and point of use (PoU). In total, 120 samples from waterworks, water sumps, tubewells and consumer's tap before and after chlorination were tested by PCRWR. The overall summary has been submitted to Prime Minister's Innovation Task Force and Director General (Water Supply), MCI for optimization of chlorination facilities within ICT.



*PCRWR field team collecting water samples*

## Up-gradation of Trace Metals Laboratory, NWQL PCRWR

AGHA Khan University with sponsorship of UNICEF and WHO provided state of the art equipment to the National Water Quality Laboratory (NWQL), Islamabad under the National Nutrition Survey (2018). This has resulted in an enhanced testing capability for heavy metals. The equipment includes Inductively Coupled Plasma (ICP-OES) for simultaneous multi-parameter analysis in water and wastewater, Atomic Absorption Spectrometer, Spectrophotometer and microwave digester. These equipment have successfully been installed in NWQL for wide range testing.



*Upgraded trace metal equipment*

# Trans-boundary Effects on Ground and Surface Waters along the Eastern Border of Pakistan

Pakistan has shared water sources with India regulated through Indus Waters Treaty (IWT) and groundwater is not part of the IWT. There are indications that due to huge groundwater pumping in Indian Punjab, the groundwater along the Pakistan borders may be affected (in terms of its quality and quantity). The objective of the project is to study groundwater flow pattern and characteristics along Pakistan - India border. By the reported year PCRWR has completed the research project and carried out following major activities.

- Established groundwater assessment gadgets and data collection for water-table depth and groundwater sampling.
- Monitored and evaluated trans-boundary groundwater behavior from Water-table observation points (850) in the project area.
- Organized a Project Completion Workshop to share outcomes of the project to potential stakeholders.

The preliminary findings of the project based on 2 years of monitoring of groundwater levels reflects localized changes i.e.

- Normally, groundwater has similar gradient to land surface except those areas where excessive pumping is being carried out i.e. Lahore.
- Temporally, groundwater levels are decreasing in district Lahore, Kasur and Narowal while increasing in Sialkot, Gujranwala and Sheikhpura.
- Natural Land gradient is from east to west with highest land elevation in Narowal and Lowest land elevation in Kasur district.
- Quality of shallow groundwater is in marginal range in most of the study area whereas, some areas of district Kasur have brackish groundwater.
- The monitoring of Hudiara drain showed that the quality of wastewater in Hudiara drain is above permissible limits and high quantity of arsenic and lead is found.



*Group photo of the participant of project completion workshop*

# Improved Land and Water Conservation Practices to Enhance Wasteland Productivity in Thal Desert

*The project is being carried out in Thal Desert with the objective to introduce various improved land and water conservation practices. This include solar-powered drip irrigation system, sprinkler irrigation, etc. During the reported period following progress have been made;*

- Installed four Solar powered drip and sprinkler irrigation systems at Noorpur Thal, district Khushab and Dulewala and Mankera, district Bhakkar.
- Provided vegetative cover at four sites of indigenous Khagal plants (10,925 plants) to control the issue of wind erosion and sand dune stabilization.



*Picture of Installed Solar Pumping System*



*Picture of Developed Orchard on Drip System*



*Picture of Gram Crop on Sprinkler*

# Developing Approaches to Enhance Farmer Water Management Skills in Balochistan, Punjab and Sindh in Pakistan

## Partners:

- University of Canberra
- Commonwealth Scientific and Industrial Research Organisation (CSIRO)
- Pakistan Council of Research in Water Resources (PCRWR)
- Social Sciences Research Institute-PARC
- Society of Facilitators and Trainers (SOFT)

*The project is funded by ACIAR and is focused to develop tools and approaches for increasing farmers' irrigation management skills. The project is being implemented in 49 villages located in Bahawalpur, Sargodha, Faisalabad, Nawabshah, Hyderabad and Quetta.*

During the reported year, following key activities were performed:

- Stakeholder forum along with FILM model workshop was conducted in Quetta.
- End line social survey in 49 project sites was completed and analysis report prepared.
- Farmer stories were collected conducted regarding the use and application of moisture and nutrient management technologies
- Farmer's stories were collected regarding the role of PCRWR in improving their field practices, i.e. growing rice on beds in Sargodha region.
- Final review of the project was completed in May 2021 by a panel of experts from Australia and Pakistan.



*A farmer is observing data*



*Screenshot of workshop participants*

# Improving Groundwater Management to Enhance Agriculture and Farming Livelihoods in Pakistan

*The project is funded by ACIAR with the following objectives:*

- Develop and articulate a shared understanding of sustainable groundwater use for agriculture and the need for improve management in Balochistan, Punjab and Sindh provinces.
- Develop with collaborating stakeholders in each case study, groundwater management tools and options that have the potential to enhance livelihoods of farming families.
- Enhance capacity and institutional arrangements for post project adoption of tools and options develop in objective 2 by collaborating with stakeholder organizations.
- Representative Agricultural Pathways (RAP) sessions have been conducted and appropriate key interventions have been identified through consultation with provincial stakeholders for trial implementation at farmer fields.
- Successfully conducted trial of low water & high value crops at farmer fields: Mong cultivation in Sahiwal-Punjab and grapes & pistachio on drip system at Zargoan, Malikyar and Huramazai in Balochistan.
- Developed mobile apps/gadgets (Apna Paani & Apna Farm) and build capacity of farming community as well as youth for water conservation.
- Professional capacities of respective provincial irrigation departments have been developed for project sites in groundwater modeling and management: LBDC-Punjab, Nausheroferoze & Shaheed Benazirabad-Sindh, Pishin & Kuchlak-Balochistan.
- Project findings have been shared with all stakeholders through workshops, conferences, seminars and various publications have been produced in the form of reports, research articles, book chapters, etc.
- Successfully conducted project review by external experts and appreciated project team for timely completion of various project activities.





# **Regular Research and Development Activities**



# Sustainable Management of Groundwater at Fatima Fertilizer Limited Tube Well-Site

PCRWR conducted a water balance study at FFL reservoir site during 2012-15 and proposed a tubewell site and strategies for sustainable management of groundwater. However, on the request of FFL PCRWR conducted a study during the reported period for relocation of water resource reservoirs of FFL. These groundwater investigations were conducted for evaluation of best fit water sources at FFL plant site through Geophysical Survey for conjunctive use and water table depth status. The maps below at various depths describe the status of groundwater quality along the Ahmedpur Lamma Distributary.

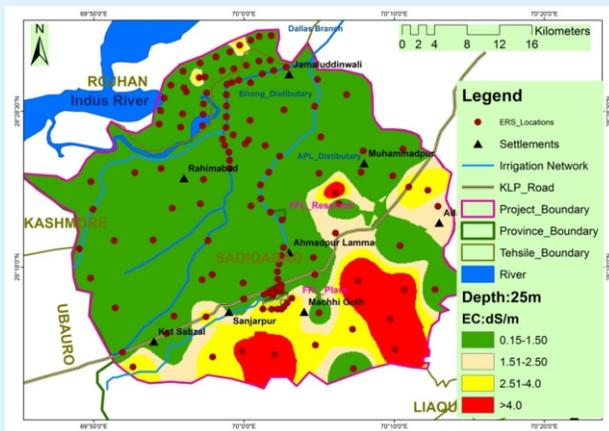


Figure showing groundwater quality at water table depth at 25 m

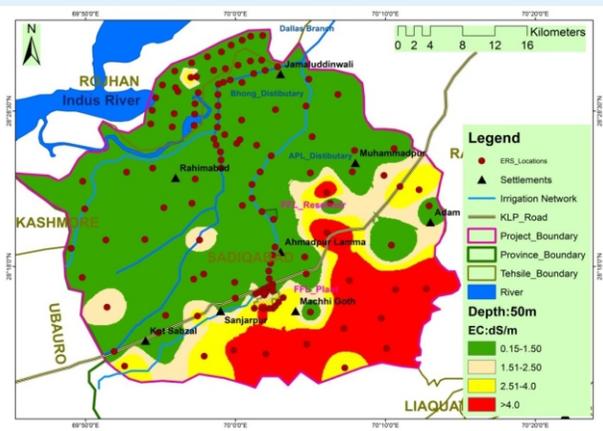


Figure showing groundwater quality at water table depth at 50 m

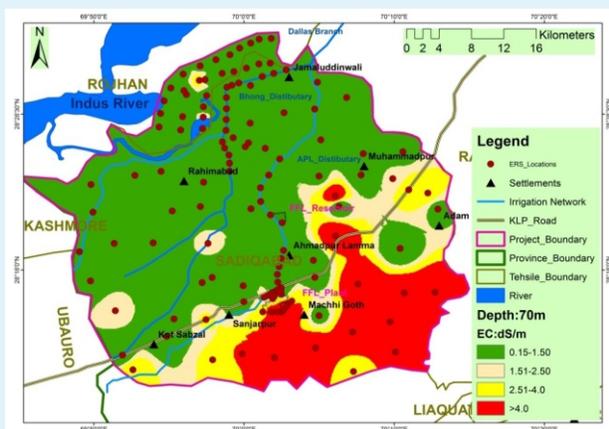


Figure showing groundwater quality at water table depth at 70 m

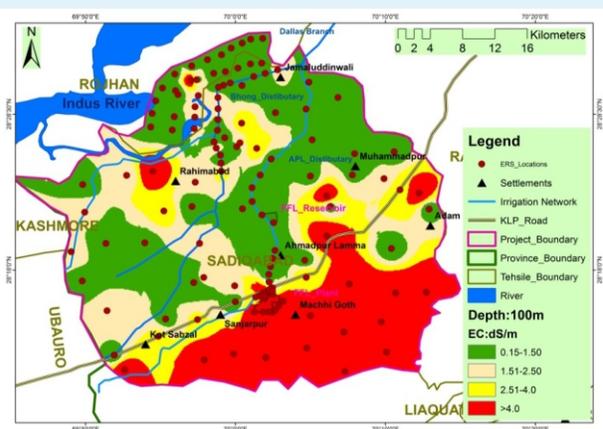


Figure showing groundwater quality at water table depth at 100 m

# Inventory of Water Resources and Vegetation Pattern of Cholistan Desert

PCRWR has undertaken the task of groundwater survey, soil sampling for texture classification and inventory of vegetation pattern, human & livestock population heads near the Ponds/Villages in Cholistan. Maps below show the status of groundwater quality in the Cholistan.

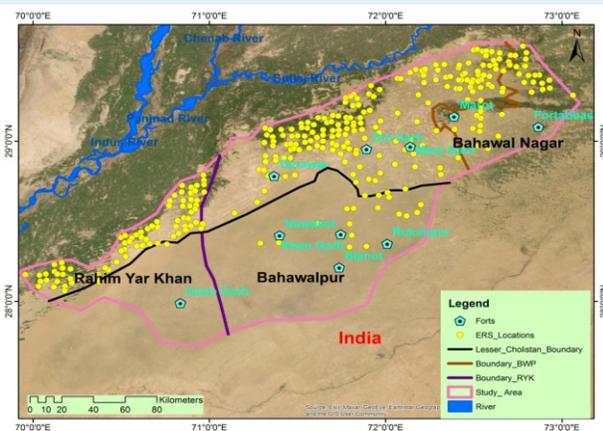


Figure showing ERS locations in the study area

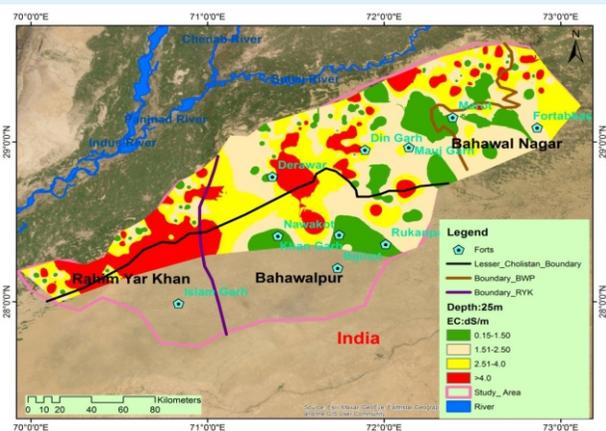


Figure showing groundwater quality at water table depth at 25 m

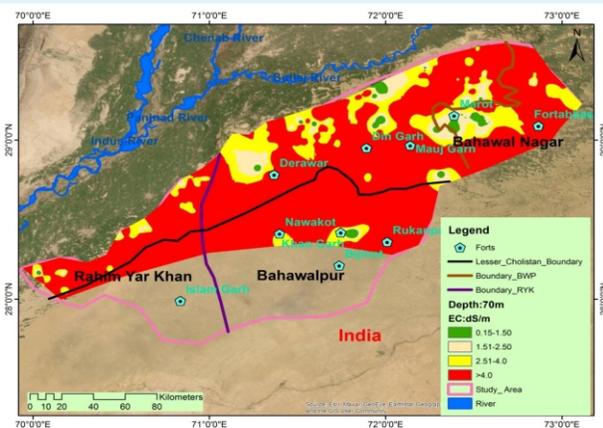


Figure showing groundwater quality at water table depth at 70 m

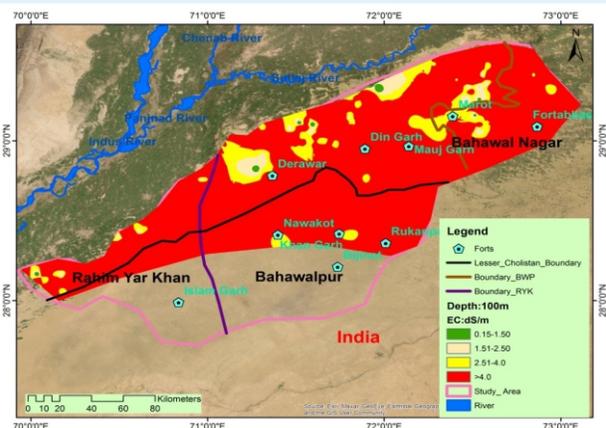


Figure showing groundwater quality at water table depth at 100 m

## Groundwater Assessment in District Jhelum

PCRWR conducted groundwater assessment survey in district Jhelum during the reported period. The interpretation of the ERS data led to the identification of the geo-electrical and geological successions consists of four zones. The first zone (brown) is dry/unsaturated, the second (yellow) is composed mainly of clay/shale, the third zone (tea pink) bears marginal/slightly saline groundwater quality or fine sandstone with low permeability and the fourth one is fractured limestone/coarse sandstone fully saturated and representing fresh water bearing layer. The spatial variations in groundwater quality are presented.

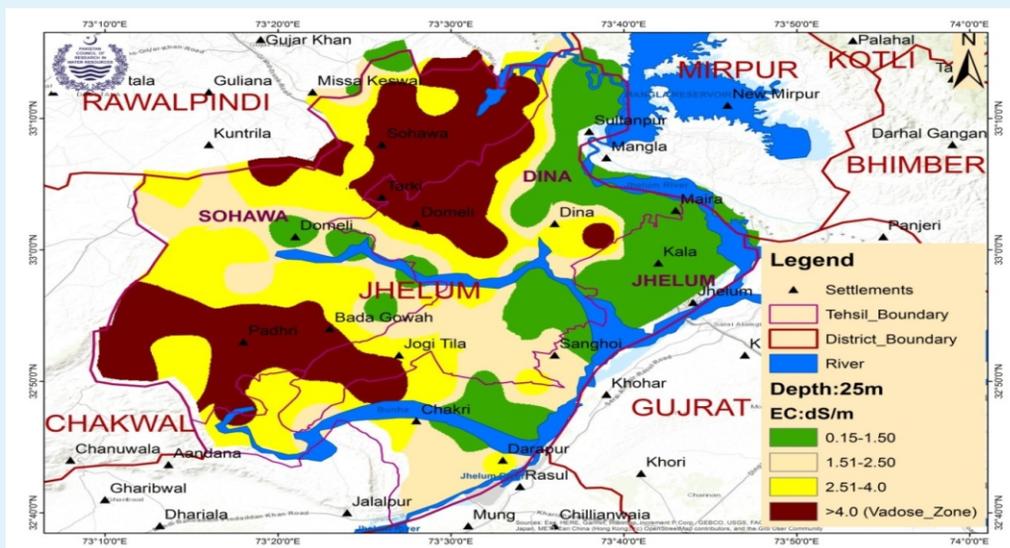


Figure showing groundwater quality at water table depth at 25 m

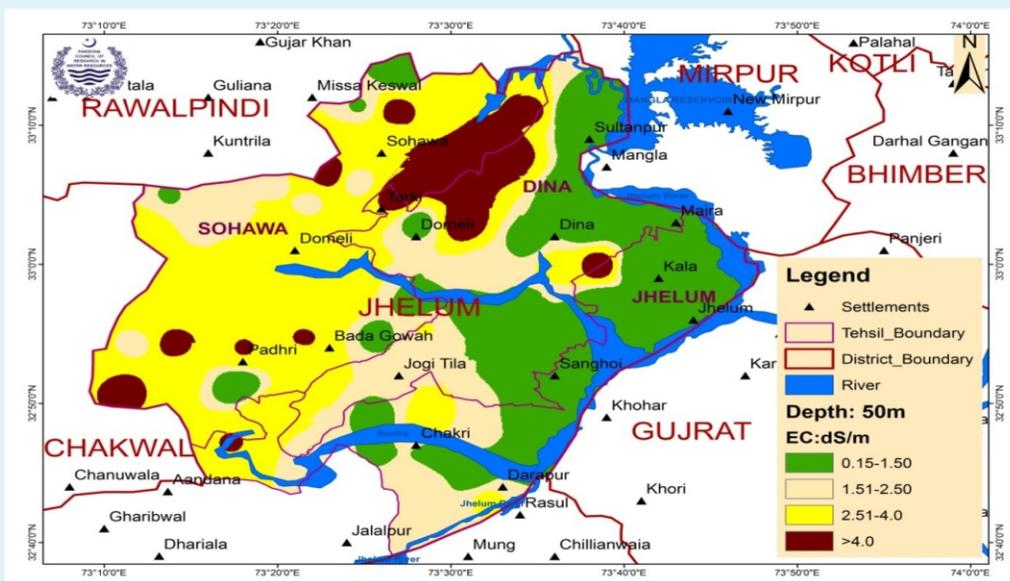
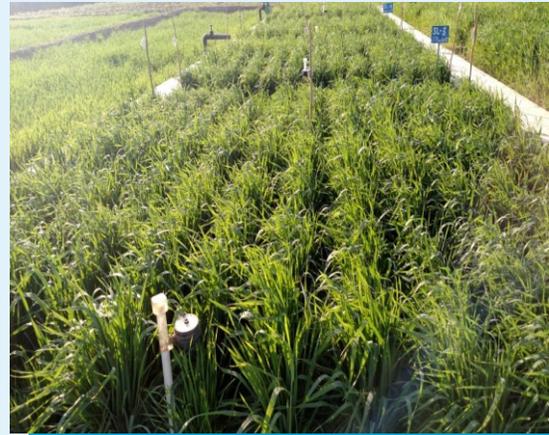


Figure showing groundwater quality at water table depth at 50 m

## Evaluation of Sprinkler and Conventional Irrigation Systems on the Yield and Water Use Efficiency of Chickpeas and Sesame Crops at DRIP, Tandojam

The research study is aimed to determine the yield, yield parameters and water productivity of chickpeas and sesame crops under sprinkler and conventional irrigation systems; to assess the water saving for chickpeas and sesame crops under sprinkler and conventional irrigation systems; and, to evaluate the impact of sprinkler and conventional irrigation systems on pre and post soil salinity status. It was found for chickpea crops yield was 682 kg/ha and 341 kg/ha with water use of 200 mm and 300 mm under sprinkler and conventional method, respectively. The corresponding water-use efficiency was found as 0.34 and 0.11 kg/m<sup>3</sup> under sprinkler and conventional method, respectively.



## Determination of Consumptive Use of Water for Cotton and Wheat Crops under Different Water table Depths at DRIP, Tandojam

The study is aimed to determine the crop water requirement (CWR) for cotton and wheat under different water table depths in the Lower Indus Basin. The water requirement of cotton at 1.50, 2.25 and 2.75 m WTDs was found as 705, 676 and 667 mm. Of that groundwater contributed 183, 102 and 38 mm. The yield was found as 2034, 1953 and 1783 kg/ha at 1.50, 2.25 and 2.75 m WTDs.

The total wheat ET was found as 460-485 mm, 429-433 mm and 421-430 mm at 1.50 m, 2.25 m and 2.75 m WTDs. The total yield was obtained as 4679-4862 kg/ha, 4405-4778 kg/ha and 4219-4639 kg/ha at 1.50 m, 2.25 m and 2.75 m WTDs. The water-use efficiency varied between 1.00-1.02 kg/m<sup>3</sup>, 1.03-1.10 kg/m<sup>3</sup> and 1-1.08 kg/m<sup>3</sup> at 1.50 m, 2.25 m and 2.75 m WTDs.



## Evaluation of the Prospects of Growing Wheat and Rice Crops on Beds, R&D Centre Sialmore

Wheat and rice are important cereal crops of Pakistan. Despite the constrained availability of water resources, farmers are still using conventional irrigation practices that are resulting in huge water losses, especially in rice crops. This crop is not only water-intensive but also have a higher production cost due to high costs of labour, energy and water. Under these circumstances, there is a dire need to apply irrigation water efficiently not only to save the irrigation water but also to increase water productivity.

PCRWR conducted a series of experiments to combat the situation and introduce new water-saving methods by growing rice and wheat on beds and ridges. The bed planting provides evidence that rice can be successfully grown and raised on beds without standing water in the field. PCRWR also introduced DSR (direct-seeded rice) technology for rice cultivation. These techniques not only save water in the rice crop but also give higher yield and water productivity and increase in profitability of the farmers.



*Sowing of Wheat crop on Beds*



*Sowing of wheat on Ridges*



*Direct seeded rice on beds*



*Rice plantation on beds*

## Effect of Conjunctive Use of Saline Ground Water and Fresh Rainwater on Growth of Various Fruit, Fuel and Medicinal Plants in Cholistan Desert

The study was introduced at Field Research Station Dingarh (Cholistan) on about 5 acres of barren desert land.

Tree plantation of various plant species at research site has been carried out such as fruit, fuel and medicinal plants species. Whereas among them some were exotic and others were indigenous species. Details are given below.



*Ispaghol Crop*



*Fig plantation*



*Conocarpus plantation*

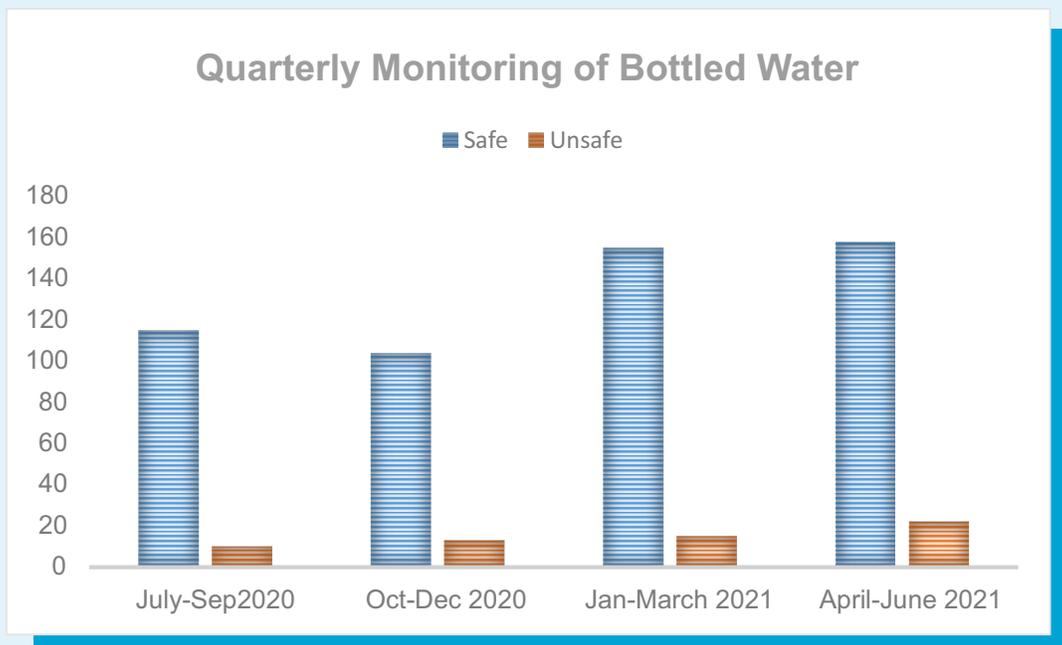


*Kariri plantation*

## Quarterly Monitoring of Mineral /Bottled Water

PCRWR is conducting regular monitoring of mineral/bottled water samples on quarterly basis. The objective of this quarterly monitoring is to identify the sub-standard bottled/mineral water brands and to bring improvement in the quality of bottled/mineral water being provided to general public. During the one year period i.e. July, 2021 to June, 2021, five hundred ninety two (592) bottled/mineral water samples of commercially available brands have been collected from major cities. All the samples were analyzed at ISO-17025 accredited National Water Quality Laboratory (NWQL) of PCRWR, Islamabad for physico-chemical and microbiological parameters. Laboratory findings were compared with permissible limits of Pakistan Standard Quality Control Authority (PSQCA) to evaluate the bottled water quality for the consumer's protection.

The findings of monitoring trials during July, 2020 to June, 2021 have revealed that out of 592 samples, 532 were found to be safe, whereas, 60 samples of various brands were declared to be unsafe due to chemical (Arsenic, Sodium, Potassium, TDS and Fluoride) or microbiological (Total Coliforms, Fecal Coliforms & E-coli) contamination. The findings of quarterly monitoring of bottled water are disseminated through print and electronic media and official website of PCRWR for the awareness of general public. The quarterly monitoring reports of every quarter were sent to the Chief Secretaries of all the provinces as well as to PSQCA with request to take appropriate legal action against the substandard brands.



# Visits and Meetings



### Federal Minister's Visit to PCRWR

Honorable Federal Minister for Science and Technology, Syed Shibli Faraz visited PCRWR on 21<sup>st</sup> May, 2021. Dr. Muhammad Ashraf, Chairman, PCRWR and his team welcomed the Hon'ble Minister. The Chairman, briefed him about R&D activities of the Council, its mandate, infrastructure, research areas, past achievements, ongoing projects and budget. The Federal Minister acknowledged the work done by PCRWR.



### Federal Minister for Science & Technology, Chaired a Meeting on Water Issues of Islamabad

Honorable Federal Minister for Science & Technology, Syed Shibli Faraz chaired a meeting on water issues of Islamabad on June 08, 2021. Dr. Muhammad Ashraf, Chairman, PCRWR briefed the chair about prevailing situation of water availability and associated drinking water challenges. Moreover, he highlighted the need for effective utilization of rainwater harvesting to control water-table depletion. Mr. Amer Ali Ahmed, Chairman, CDA informed the chair about various initiatives of CDA to manage water supply challenges. The Chair appreciated the efforts of PCRWR for groundwater resource mapping and directed PCRWR for technical support of

CDA in implementation of various rainwater harvesting initiatives and formulation of groundwater regulatory framework in Islamabad. For this purpose, PCRWR will sign an MoU with CDA and extend its technical support to manage water demand and supply gap.



### Chief Minister Gilgit Baltistan Visits PCRWR Headquarter, Islamabad

Chief Minister Gilgit Baltistan, Mr. Khalid Khurshid Khan visited PCRWR Headquarter, Islamabad on January 11, 2021. Chairman, PCRWR with his team briefed about the organization and its research areas. He also briefed the Chief Minister about the water issues of the country and more specifically of the Gilgit Baltistan. The Chairman, stressed that Gilgit Baltistan is the mother well of the country and there was a dire need to give focus on Gilgit Baltistan's water issues. The Chief Minister appreciated the efforts of PCRWR and offered to work jointly to mitigate the water issues and sustainable management of water resources. He also suggested PCRWR for capacity building of relevant departments of Gilgit Baltistan.



### Executive Director, INWRDAM, Jordan Visits PCRWR

Dr. Marwan Muhammad Al Raggad, Executive Director and Mr. Jalal Al Qaryouti, Program Manager, INWRDAM: Inter-Islamic Network on Water Resources Development and Management visited PCRWR Headquarters on February 12, 2021 and held a meeting with Chairman PCRWR. Dr. Muhammad Ashraf, Chairman briefed the delegates about PCRWR activities of mutual interest of both the organizations. Dr. Marwan briefed about the upcoming activities of INWRDAM and hoped for the active participation from the member countries. It was decided in the meeting that new avenues of mutual interest especially in field of transboundary water distribution, water diplomacy, wastewater management, dryland agriculture and hydroponic agriculture should be explored and collaborative efforts should be made to address water related issues.



**Federal Secretary, Ministry of Science and Technology  
Visits PCRWR**

Dr. Arshad Mahmood, Federal Secretary for Science and Technology visited PCRWR Head Office Islamabad on February 2, 2021. Dr. Muhammad Ashraf, Chairman PCRWR with his team briefly presented the work of PCRWR being done in the water sector. The Federal Secretary appreciated PCRWR's efforts and stressed that more research of applied nature has to be done in water sector and PCRWR being the national organization has to play a leading role. He also assured of his full support for solving administrative and financial issues of the Council.



**Commissioner Rawalpindi Division Visits PCRWR**

Capt. (R) Muhammad Mehmood, Commissioner Rawalpindi Division visited PCRWR Headquarters, Islamabad on January 20, 2021. The Chairman, PCRWR along with his team briefed about the organization and recent activities carried out regarding water resource management, rainwater harvesting and water quality in the twin cities. The Commissioner appreciated the efforts of PCRWR and asked for technical support of PCRWR to cope with Rawalpindi water issues. The Chairman, PCRWR assured of his full support and assigned his team for assessment of Commissioner's office building for rainwater harvesting for groundwater recharge.



## Meetings of the Board of Governors of PCRWR

The 8<sup>th</sup> Meeting of PCRWR Board of Governors (BoG) was held on 23<sup>rd</sup> July 2020. The meeting was chaired by the president BoG, Chaudhary Fawad Hussain, Federal Minister Science and Technology. Key agenda of the meeting was to discuss the collaborative efforts of PCRWR to overcome water related issues in the country. It was also decided in the meeting that PCRWR being the national organization in water research would conduct a comprehensive study on industrial wastewater management and will

share it with Karachi Chamber of Commerce. It was decided that PCRWR would approach Commissioner Karachi and relevant authorities to come up with a workable solution for proper drainage in Karachi. Moreover, administrative and technical matters of PCRWR were also discussed.



The 9<sup>th</sup> meeting of Board of Governors of PCRWR was held in the committee room of Ministry of Science and Technology on 1<sup>st</sup> October, 2020. The meeting was Chaired by the president Board of Governors, Chaudhary Fawad Hussain, Minister for Science and Technology. Most of the members of the Board attended the meeting virtually. In the meeting, progress on the decisions made in the 8<sup>th</sup> meeting was discussed.

held in the committee room of Ministry of Science and Technology on February 25, 2021. The meeting was chaired by Dr. Arshad Mahmood, Vice-President of BoG/Federal Secretary for Science and Technology. The members from outside Islamabad attended the meeting virtually. The Board approved amendment in Section-16 of PCRWR Act-2007 through Presidential Ordinance as well as newly framed PCRWR Draft Employees' Service Rules 2021 for vetting from quarters concerned.



## Chairman, IRSA Visits PCRWR

Mr. Rao Irshad Ali Khan, Chairman IRSA visited PCRWR and met with the Chairman, PCRWR on January 07, 2021. In the meeting, progress on the telemetry system and water related issues were discussed.



## Executive Director, CGSS Visits PCRWR

Lt. Col. Khalid Taimur Akram (Retd), Executive Director, Center for Global & Strategic Studies (CGSS) and Dr. Steffen Kudella, Resident Representative of Hanns Seidel Foundation (HSF) Pakistan visited PCRWR and met the Chairman on February 16, 2021. The meeting intended to explore new areas of mutual interest for strong collaboration among the organizations.



## Vice Admiral Abdul Aleem, DG, NIMA, with his Team visit PCRWR

Vice Admiral Abdul Aleem, DG, NIMA, with his Team visited PCRWR Headquarters and met Chairman PCRWR, on 04 May 2021. The Chairman PCRWR briefed about the on-going activities of PCRWR and discussed on the way forward to extend the collaboration.

## Country Director, IWMI Visits PCRWR

Dr. Mohsin Hafeez, Country Director, International Water Management Institute (IWMI) visited PCRWR on February 17, 2021 and met with the Chairman, PCRWR. In the meeting, draft IWRM implementation guidelines for Pakistan were discussed. Dr. Mohsin Hafeez gave his inputs on the draft guidelines.

## Meeting with 2030 Water Resource Group

Two online meetings were held with the World Bank's 2030 Water Resource Group experts via zoom link on January 28 and March 04, 2021. The meetings intended to discuss the water resources issues of Pakistan, especially issues related to wastewater management, agriculture water use efficiency and groundwater management.

### Meeting with IFAD-UN Delegation

A 2-member delegation from IFAD-UN visited PCRWR on January 6, 2021. Dr. Muhammad Ashraf, Chairman PCRWR presented an overview of Council's R&D activities.

### Visit of BIDR team at PCRWR

A five-member team from Bei Fang Investigation, Design & Research Company (BIDR) China visited PCRWR on 16th September, 2020. The BIDR representatives introduced the nature of their work in Pakistan, while Chairman, PCRWR shed a light on various activities of PCRWR. The meeting was concluded on the decision that both the parties would explore the possible areas of mutual cooperation.



### Visit of Chairman, BISE Bahawalpur at PCRWR, Islamabad

Dr. Mazhar Saeed, Chairman, BISE Bahawalpur visited PCRWR Headquarters, Islamabad on 25<sup>th</sup> August, 2020 and planted a tree at PCRWR Headquarters under tree plantation campaign. The Chairman PCRWR, was also present on the occasion.



### Visit of Collector, Land and Revenue Department, Quetta at WRRRC, Quetta

Mr. Aziz-ur-Rehman, Collector of Land & Revenue Department visited WRRRC, Quetta. He was briefed about the activities of PCRWR by Deputy Director (Incharge). He appreciated the efforts of PCRWR in water sector.



## Meeting with Director General, National Institute of Oceanography (NIO)

DRIP organized a meeting with Director General, National Institute of Oceanography (NIO), Karachi and Dr. Samina Project Director “The Sea Water Intrusion, Sea Level Rise, Coastal Erosion & Land subsidence along Sindh and Balochistan Coast” on December 16, 2020 to perceive the collaborative areas in monitoring of Sea Water Intrusion. Engr. Hafiz Abdul Salam, Deputy Director and Mr. Muhammad Farooque, Assistant Director, DRIP participated in the meeting.



## Visit of Director NIA

Mr. Muhammad Yousuf, Director, Nuclear Institute of Agriculture (NIA), Tando Jam visited DRIP Campus Tando Jam on 08 October, 2020. The DRIP professionals briefed the delegation on R&D activities of DRIP campus, Tando Jam.



## Visit of Director, PARC

Dr. Zubair Ahmad, Director, Pakistan Agriculture Research Council (PARC), Islamabad visited DRIP Campus Tando Jam on 04 December, 2020. The DRIP professionals briefed the delegation on R&D activities of DRIP, Tando Jam.



## Mr. Hasnain Mirza Visited DRIP, Tandojam

Mr. Hasnain Mirza, MPA (Sindh Provincial Assembly) Visited on March 26, 2021 at DRIP Campus, Tando Jam. The Senior Research Officer (Incharge) and DRIP professionals briefed the delegate regarding R&D activities of DRIP. The delegate visited the R&D Farm, lysimeter station, tile drainage machinery, soil & water quality analysis laboratory and took keen interest in all activities.



### Meeting with Director General Agriculture Department, Quetta

A meeting was held between WRRRC official i.e. Ms. Ziviqar Dy. Director (Incharge) WRRRC, Quetta, Mr. Imtiaz Ali, Assistant Director and Mr. Juma Khan Director General Agriculture Department Government of Balochistan regarding requisition of olive plants for installation of the same in ARI Farm. Furthermore, the demand of requisition of some 500 olive plants was entertained and plants were provided. The officer admired the efforts made by WRRRC Quetta about research purpose plantation at ARI and assured the provision of water for plantation purpose once a week.



### Visit of Director, Forest Department Balochistan

Mr. Mazar-UI-Haq Director of Forest Department Government of Balochistan paid a visit to Agriculture Research Institute along with Ms. Ziviqar Dy. Director (Incharge) WRRC, Quetta and Mr. Imtiaz Ali, Assistant Director Field whereby, steps taken by PCRWR, WRRC Quetta with regard to plantation of trees and plants were appreciated and it was decided that in future Forest Department will be happy to extend its cooperation. Furthermore, it was decided that Forest Department will provide plants, trees, seeds and most importantly provide plot which could be utilized to conduct research activities in future.



### Visit of Muslim Hand Organization Delegation

Mr. Kashif Program Manager Muslim Hand Organization visited the Water Resources Research Center Quetta, alongwith officials of Muslim Hand Organization dated 25<sup>th</sup> January, 2021. MS. Ziviqar Dy. Director (Incharge) gave a detailed briefing about expertise

and activities of the Water Resources Research Center. Respected guests also visited the Water Quality Lab and showed their keen interest in water quality analysis and also ensure their corporation on Water Quality Testing and training activities in Balochistan.



### Visit of Chief Forest Conservator of Forest Department, Quetta

Ms. Ziviqar, Deputy Director (Incharge), WRRC Quetta organized Plantation activity with the coordination of Balochistan Forest Department at ARI Research Station Saryab Road Quetta on March 19, 2021 Chief Conservator Forest Mr. Abdul Jabbar, Forest Department Government of Balochistan was the Chief guest of the event alongwith Director Forest Mr. Mazhar ul Haq and Additional Director Mr. Abdul Razzaq. Chief guest inaugurated the spring season plantation by planting a Plant. Moreover it was observed that growth of plants being produced in Green house was fine and some recommendations regarding the

same were presented. Some 1500 plants were handed over to WRRC, Quetta and the worthy guest also extended cooperation from Forest Department in future.



### Visit of Chairperson Textile Engineering, BUIITEMS

Dr. Zameer Ul Hassan Chairperson Textile Engineering, Balochistan University of Information Technology, Engineering and Management Sciences (BUIITEMS) paid a research purpose visit to WRRC, Quetta. The officer was introduced to Water Quality Analysis on different parameters and was also updated regarding PCRWR Lab facilities. Moreover, the officer took keen interest in water testing process and conferred appreciation.



### Meeting with Lt. Colonel Tariq Malik and the representative of Defense Housing Authority (DHA, Bahawalpur)

Mr. Muhammad Imran Deputy Director and Dr. Muhammad Akram Assistant Director attended a meeting with the representative of Defense Housing Authority (DHA, Bahawalpur), Lt. Colonel Tariq Malik. PCRWR Officers represented about the process of Groundwater Assessment Survey and Water Quality Analysis for the entire area of 6500 Acres of DHA. He appreciated the activities of PCRWR for water resource management and shows great interest for the utilization of PCRWR services.

### Meeting with Dr. Ashiq Ahmed Khan Scientific Representative, EvK2CNR and Multinational Conservationist

A 3-members team from PCRWR lead by Mr. Muhammad Imran Deputy Director met with Dr. Ashiq Ahmed Khan Scientific Representative, EvK2CNR. Dr. Shazia Chairman CIDS, IUB, Dr. Abdullah Associate Professor CIDS and Major Tahir Houbara Foundation on January 22, 2021. A brief description was presented on current PCRWR activities i.e. Inventory of Water Resources and Vegetation Pattern of Cholistan Desert and the collaboration with

local NGOS for water quality monitoring. It was decided in the meeting to enhance the collaboration on water resources management in Cholistan desert. PCRWR will provide technical support to CIDS and Houbara Foundation to construct rainwater harvesting ponds and Groundwater Investigations at specified sites.

### Meeting with Director Wild Life at Bahawalpur Zoo Park

Mr. Muhammad Imran Deputy Director and Mr. Tahir Saleem Assistant Director attended a meeting with Director Wild Life at Bahawalpur Zoo Park on January 22, 2021. It was decided in the meeting that PCRWR will provide groundwater investigation services for the installation of new turbine and also water quality monitoring to provide safe drinking water to the wild life of zoo.

### Meeting with the Representatives of Bunyad Foundation

Dr. Muhammad Akram Research Officer met with the representatives of Bunyad Foundation on dated January 25, 2021 for the provision assistance for the installation of hand pumps in Tehsil Ali Pur District Muzaffargarh through water quality analysis.

### Meeting with Mr. Muhammad Ikhtlaq. (Regional Agriculture Research Institute)

A research project, on non productive areas i.e. Cholistan Desert, will be launched by Horticulture Department, Bahawalpur. It was decided in the meeting that PCRWR will provide 5 acre land at its Field Research station Din Garh, to carry out research activities. Fencing, installation of turbine on solar system, Drip irrigation system to irrigate ten types of fruit plants, is included in their project.

### Meeting with representatives of DOABA Foundation

Dr. Muhammad Akram (R.O) attended a meeting with representatives of DOABA Foundation on dated February 12, 2021. It was decided in the meeting that PCRWR will provide technical assistance for installation of handpumps through water quality analysis in Alipur and Layyah.

### Meeting with Director On Farm Water Management, Bahawalpur

Mr. Muhammad Imran Deputy Director and Mr. Tahir Saleem Assistant Director attended a meeting with Director On Farm Water Management, Bahawalpur on dated March 05, 2021 for

guidance to improve the drip irrigation system at Field Research Station Din Garh. It was decided in the meeting that PCRWR will provide technical guidance regarding Groundwater Quality before installation of Drip Irrigation system.

### Meeting with the Conservator Department of Forest, Bahawalpur

Mr. Muhammad Imran Deputy Director and Mr. Tahir Saleem Assistant Director attended a meeting with The Conservator Department of Forest, Bahawalpur on dated March 08, 2021. PCRWR team briefly described the research activities carried out at Field Research Station Din Garh and requested him to visit the FRS Din Garh and also requested for the nursery plants of Arjun Specie for plantation at Din Garh.

### Meeting with National Rural Support Program and Help in Need

Dr. Muhammad Akram Research Officer of this office attended a meeting with District Program Officer of "National Rural Support Program" and with Regional Supervisor of "Help In Needs" NGO on dated March 09, 2021. It was decided in the meetings that PCRWR will provide technical assistance for installation of hand-pumps through water quality analysis.



# **Human Resource Development**



## Capacity Building Sessions for RSPNS

Rural Support Program Network (RSPN) under “Programme for Improved Nutrition in Sindh” (PINS) is conducting water testing in ten districts of Sindh in collaboration with National Rural Support Programme (NRSP), Sindh Rural Support Organization (SRSO) and Thardeep Rural Development Program (TRDP). PCRWR organized capacity building sessions from 11-16th November, 2020 in Sukkur, Jamshoro and Sehwan for WASH officers and Field Engineers of the organizations at their respective offices.

PCRWR team also conducted monitoring visits across programme districts along with PINS and RSPNs officers to orient field staff on water quality sample collection and transportation to

nearby PCRWR laboratories for validation. PCRWR officials also provided on-job coaching to RSPNs technical teams on water quality testing using the field test kits during the field visits. PCRWR also provided technical support on water supply schemes as part of PINS' work in improving access to safe drinking water and safely managed water sources.



*Dr. Ghulam Murtaza, PCRWR conducting capacity building training session*

## AoC between PCRWR and Helping Hand for Relief and Development (HHRD)

Chairman PCRWR, Dr. Muhammad Ashraf and Country Director, HHRD M. Saleem Mansoori signed Agreement of Cooperation (AoC) at PCRWR Headquarters Islamabad on February 22, 2021. This Agreement is aimed to establish the terms and conditions under which PCRWR will facilitate the HHRD to resolve the water related issues and improve the quality of water all over Pakistan, including AJ&K and Gilgit Baltistan.



*Photo of AoC signing ceremony between PCRWR and HHRD*

### Up-gradation of Microbiological Data Generation Facility of WQL, Gilgit

PCRWR NWQL team imparted training to WQL Gilgit (21<sup>st</sup> to 27<sup>th</sup> September, 2020) in order to enhance its capacity for water testing specifically the microbiological testing for Total Coliforms, Fecal Coliforms and E-coli.



### Training Session at NRSP

A one-day training session at NRSP office, Bahawalpur was organized by Regional Office PCRWR, Bahawalpur on 19th December 2020 for water quality testing techniques and water sampling. This training included demonstration of water sampling from various sources, field testing, preservation, storage, transportation and field documentations to evaluate the water quality of public water sources being used for drinking.

### Technical Assistance for Water Quality Sample Collection

Pakistan Council of Research in Water Resources Regional Office, Bahawalpur is providing technical assistance for the installation of 200 Hand pumps to a non-governmental organization "HELP IN NEED" in the remote areas of Bahawalpur. A training session was organized to train the staff to collect water samples.

### Training on Discharge Measurement through ADCP

PCRWR organized a training on Discharge Measurement through ADCP on February 1-4, 2021 at PCRWR Headquarter, Islamabad. The training was organized to build capacity of Sindh Irrigation and Drainage Authority (SIDA) and PCRWR professionals for initiating the project activities for Groundwater Investigation and Mapping in Sindh. The training consisted of three-days lectures and one-day field training on River Jhelum. Fifteen participants attended the training.



## Farmers Integrated Learning Model (FILM) workshop

PCRWR and SOFT jointly organized Farmers Integrated Learning Model (FILM) workshop separately in two villages district Sargodha from 10-11 September and 12-13 September 2020 in villages 94/NB and 107/NB respectively and field visits under the ACIAR funded project (LWR-074). The aim of FILM workshop is to conduct farmers to farmers learning, prepare farmer facilitators with their group in order to engage the group farmers and new farmers listed. Total 45 and 23 farmers from nine model villages of Value Management (VM), Collaborative Problem Solving (CPS) and Discovering Learning (DL) participated the workshop. Two days workshop activities, comprises Introduction of Participants, Problem Identification, Prioritization of Problem, Top Scored Problem, ABCD (Assets Based Community Development), Brainstorming of Ideas, SWOT (Strength, Weakness, Opportunities and Threats), Selection of Promising idea (by voting), Action Plan.

## Training of Students at DRIP Tandojam

The trainees under Benazir Bhutto Shaheed Youth Development Program, Hyderabad visited DRIP Campus Tando Jam on December

18, 2020. The professionals of DRIP briefed the delegation on R&D activities of DRIP, Tando Jam.



## Capacity Building Training Session with Thar Rural Development Program (TRDP)

PCRWR Regional Office, Karachi arranged capacity building training session with Thar Rural Development Program (TRDP) District Office, Sehwan on 19 November, 2020. The TRDP staff & field engineers on water sampling, preservation & transportation protocols and field water testing participated in the event.

## Water Quality Technician Course at DRIP, Tando Jam

The NAVTTC, Islamabad selected the DRIP Campus Tando Jam, PCRWR Regional Office Karachi and Water Quality Laboratory Badin to conduct the technician courses on “water quality testing and treatment” at respective centers. After selection of suitable candidates, the classes were started w.e.f 16.4.2021 at respective centers.



### Capacity Building Training session for the NGO "HELP IN NEED" In District Bahawalpur

PCRWR is providing assistance to NGO "HELP IN NEED" for the installation of 450 Hand pumps in backward areas of Bahawalpur for local community through water quality analysis (during trail boring). In this Regards a training session was arranged for sampling methods (especially for microbiological analysis) to train the staff of "HELP IN NEED" after the installation of these hand pumps.

### Capacity Building Training session for TMA City Bahawalpur

A team of PCRWR Regional Office, Bahawalpur visited all filtration plants of TMA to provide the assistance for the maintenance of filtration plants and proposed the remedial measures such as installation of Arsenic removal filters, UV lamps, UF membranes, hypo chlorinator and replacement of media etc. WQL has also provided training to staff of TMA for proper maintenance, cleaning & backwash of these filtration plants.



### Capacity Building Training of NRSP staff at District Bahawalpur

During the year, Regional Office Bahawalpur with the collaboration of National Rural Support Programme (NRSP) monitored the water quality of more than 550 public water sources including hand pumps, injector pumps, water supply schemes and filtration plants under the project. "Water, Immunization, Sanitation and Education Indicator



Improvement” (W.I.S.E) launched by NRSP in Tehsil Hasilpur and Chistian. For the awareness of local community the sources which are safe for drinking were marked with green whereas unsafe sources were marked with red. During the meeting with Regional Incharge NRSP, NGO's dated December 18, 2020. It was decided this activity will be again started in remaining areas. In this regard one day training session at NRSP office was organized dated December 19, 2020 for water quality testing techniques and water sampling. This training included demonstration on water sampling from various sources, field testing, and preservation, storage, transportation and field documentations to evaluate the exact water quality of public water sources being used for drinking.

## Capacity Building Training session for the Doaba Foundation staff at District Layyah

Regional Office PCRWR Bahawalpur arranged two days training session dated April 29-30, 2021 for the capacity building of Doaba Foundation staff at District Layyah. The aim of training session was to train the staff and local community for water quality monitoring, water sampling methods, sample storage, transportation and use of water testing kits such as Microbiological and Arsenic Testing Kits, use of basic instruments. Training session also included awareness session for local community regarding importance of water saving, water quality and plantation.





# 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.



## Irrigation Advisory Services

PCRWR launched the service on April 18, 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.



## 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.

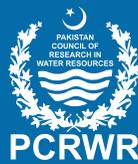


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**Pakistan Council of Research in Water Resources**  
Ministry of Science and Technology, Government of Pakistan  
Khyaban-e-Johar, H-8/1, Islamabad  
E-mail: [info@pcrwr.gov.pk](mailto:info@pcrwr.gov.pk) website: [www.pcrwr.gov.pk](http://www.pcrwr.gov.pk)