



CEWRE

ANNUAL
REPORT **2020**

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**Centre of Excellence in Water Resources Engineering
(CEWRE), UET, G.T. Road, Lahore 54890, Punjab.**



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Centre of Excellence in Water Resources Engineering (CEWRE)

UET, G.T. Road, Lahore 54890, Punjab

Tel: +92-4299250257-58, Fax: +92-42-99250259

Email: cewre@cewre.edu.pk

Website: www.cewre.edu.pk



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PATRON

Prof. Dr. Syed Mansoor Sarwar

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EDITOR

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Message from Vice Chancellor



Water is a vital resource for human well-being and functioning of the ecosystem. In recent decades availability of fresh water is stressed due to factors like population growth, enhanced living standards, and continuous degradation of freshwater resources. In addition, the impact of evident climate change on water resources of the world and our region are still not well understood. The stressed water resources system coupled with uncertainties of climate change have placed the water resources management and its conservation at higher level of nation's agenda and agenda of scientist and researchers. Sustainable water resources management is only possible through concerted efforts of the political leadership and the research community.

University of Engineering and Technology (UET), Lahore, Pakistan, the pioneer institute of higher learning in the country has always kept water related research and education at high priority because water plays pivotal role in attainment of most of the Sustainable Development Goals. Centre of Excellence in Water Resources Engineering (CEWRE) is pioneer institute at UET in imparting high-quality teaching and research in the field of water resources since 1976. Hundreds of CEWRE graduates are managing the water resources of country in Public and Private Sectors including but not limited to Punjab Irrigation Department, WAPDA, Federal Flood Commission, IWMI, UNESCO, etc.

Although Centre has already covered a long path since its inception in 1976, yet it has to cover many difficult miles to reach its goal of becoming leading world class water related research institutes. Centre should adopt the proven good practices of leading water related teaching/research institutes of the world such as IHE Delft, Colorado State University, AIT, University of Arizona etc. and prove its worth in the arena of world class institutes.

I have firm belief that Centre of Excellence in Water Resources Engineering will further improve its standing through concerted efforts of learned faculty members and staff. Annual report being published by the Centre show cases the achievements of the Centre in a year and will be helpful in critical review of its outcomes in relation to its allocated functions. University management will fully support the Centre in its endeavor of excellence.

Prof. Dr. Syed Mansoor Sarwar
Vice Chancellor/Chairman BOG

Message from Dean



Owing to a global surge in population and water scarcity, water conflicts over freshwater resources are expected to increase in the future. Within the next three decades the global population is estimated to grow at an alarming rate. Limited freshwater resources will be shared among an increased population and therefore globally per capita water availability is destined to decline dramatically. Additionally, certain other contingent aspects also account for water scarcity in the world like the rise in sea level has increased the salinity of groundwater, which has considerably diminished water supplies. Similarly, the melting of the glaciers and climate change are responsible for droughts and floods, which have also distressed water supplies.

Centre of Excellence in Water Resources Engineering (CEWRE), UET Lahore, being pioneer in water sector, is playing its role through human resource development and research activities to: measure the change in historical perspective, measure its impacts in future perspective, and come up with the possible solutions to mitigate the impacts of the looming threat to its sustainable water resources development and management. Water recycling unit in main Masjid of the campus, tree plantation, large diameter recharging wells and sprinkling irrigation system in Junaid Jamshed stadium are some of the initiatives taken by UET, to highlight the need of non-conventional ways of water stress reduction. Although small in size, but they have large impacts in terms of knowledge transferred to our students and caretaker of Pakistan.

I believe that CEWRE would sustain its glory in research and development across the water sector.

Prof. Dr. Habib Ur Rehman
Dean,
Faculty of Civil Engineering

Foreword



Since the establishment of the Centre of Excellence in Water Resources Engineering (CEWRE) in 1976, we have contributed to the nation through highly qualified professionals in the field of water resources. Over the forty years period, needs of the nation have changed from the fighting the twin menace of water logging and salinity to assuring the availability of water to stakeholders especially the irrigation and hydropower sectors of Pakistan. This Centre has contributed to bring an end to the water logging-salinity menace by imparting relevant engineering knowledge and technologies to the graduate engineers of the country and preparing them to combat the debacle successfully.

Maintaining its tradition of imparting knowledge, skill and aptitude, the Centre has successfully conducted seminars, symposia, training workshops, webinars and trained over 300 professionals through continued professional development (CPD) drive in water resources and allied disciplines in year 2020. During the year, marked with COVID-19 Pandemic, the Centre was able to complete the research work of ten Master of Engineering students, who are now performing their duties in the field of water resources with enhanced knowledge and skills.

Despite the Covid-19 closures of educational institutes all over the country, the Centre has maintained its standard of high performance without sacrificing the regular academic curriculum and the quality aspects, through shifting to online cum distance learning (ODL) way of teaching. I am personally thankful to Centre's faculty and staff, and the University management for their cooperation in the stress period of Covid-19 pandemics. Without their contribution, this gigantic task of delivering high quality education, trainings and research was not possible.

As our seniors combated against the water logging-salinity and tamed these twin menace successfully, I hope and believe that we shall overcome the issues of water stress, floods, energy shortages, and food issues through our continuous efforts and resolve to make a better sustainable Pakistan for our future generations before its too late.

Prof. Dr. Noor Muhammad Khan
Director, CEWRE

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About CEWRE

Introduction

Centre of Excellence in Water Resources Engineering (CEWRE) was established at University of Engineering and Technology, Lahore on September 04, 1976 as an institute of high-quality goal oriented teaching and research institute of Federal Government, Pakistan. The Centre is academically affiliated with University of Engineering and Technology, Lahore, which awards degrees to Centre's graduates. The functions of Centre according to the Centre of Excellence Act of 1976 are:

- Engage in goal oriented high-level teaching and research
- Train research workers
- Establish Masters, PhD and other programs in relevant disciplines in accordance with the standard and requirements of the University in which the Centre is establish
- Promote cooperation in inter-disciplinary relationship with other teaching and research establishments
- Arrange conferences, seminars and refresher courses for the development of teaching and research
- Conduct teaching and research in such particular disciplines as is assigned to it by the Federal Government in consultation with University in which the Centre is established

Vision

To generate knowledge for local and global competitive advantage and become a leading world class water related research institute.

Despite COVID-19 restrictions year 2020 has been full of activities at Centre of Excellence in Water Resources Engineering. The Centre was able to continue its educational and research and extra curricular activities following the SOP's. During the year of 2020 85 students applied in various programs of CEWRE but only 67 were able to get admission and Seven postgraduate degrees were awarded to the students on successful completion of course and research work. Other activities include two meetings of Board of Governors (BOG), two meetings of Centre's Boards of Studies (CBS), seven seminars and workshops at the Centre and an annual sports gala (prior to COVID-19 closure).

The Centre of Excellence in Water Resources Engineering was able to win one research project funded by Higher Education Commission (HEC) in addition to two on going research projects. Centre's human resources got considerable boost through induction of three highly qualified faculty members and 10 staff members. Details of research projects, seminars, workshops, degree awards, study tours and staff hiring are presented in coming pages of this annual report.

Budget (2020-2021)

CEWRE's budget is supported by HEC, Government of Pakistan and is mainly used to meet salary and operational expenses. Self income is generated mainly from courses fee, hostel fee and other research activities. Budget for research comes from collaborative research and competitive research grants funded by government and non-government agencies.

Budget of the Year 2020-2021

Description	Rs in million
Receipt-211.80	
HEC/Federal Government Grant	49.506
Own Resources + Savings	162.294
Expenditure-209.903	
Current Expenses + Salary	79.083
Development/others	130.82
Balance	1.897

Human Resource Development

In digital era of information and innovation, things are evolving at very fast pace. To meet the current challenges of digital era human resource development trainings are essential for continuous learning to cultivate the advance knowledge and skills. Lifelong learning has been emphasized by our Holy Prophet Hazrat Muhammad ﷺ as “seek knowledge from cradle to grave. CEWRE generated ample opportunities in the year of 2020 as compared to earlier years for capacity building of water professionals. Detail elaboration of training workshops and seminars organized by CEWRE are provided here.

Training Workshop on Numerical Modeling Focusing 3-D Flow Modeling

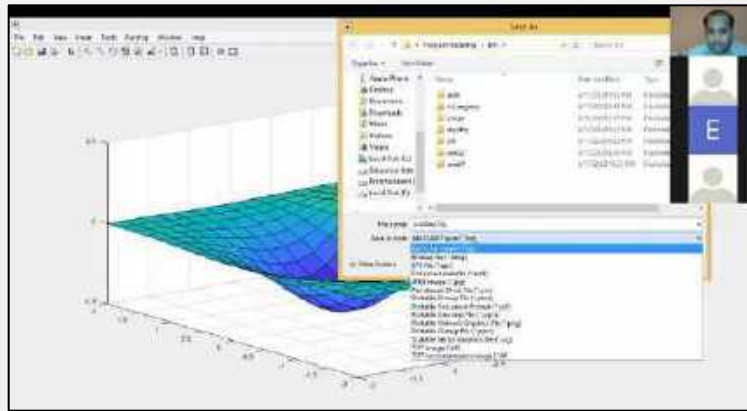
CEWRE organized five weeks training workshop titled “Numerical Modeling Focusing 3-D Flow Modeling” from Jan. 9 to Feb. 8, 2020, where fifteen professionals from Punjab Irrigation Department participated in the workshop. Dr. Ghulam Nabi, Associate Professor along with Dr. Muhammad Kaleem Sarwar, Assistant Professor conducted this training as a key resource person. The focus of workshop was enhancing the capacity of engineers and scientists in numerical modeling using state of the art numerical models namely HEC-RAS and Flow 3-D. Post workshop feedback from participants was quite energetic. CEWRE interested to extend such trainings to other provinces too.



*Group Photo of Participants and Resources Persons
of 3D Flow Modeling Workshop*

Webinar on MATLAB for Hydrology (A quick Tutorial on MATLAB)

A one-day webinar titled “MATLAB for Hydrology (A quick Tutorial on MATLAB)” was held on June 26, 2020. More than 25 participants from various organizations include MNS University of Agriculture Multan, WAPDA, NESPAK, Integrated consulting Service (Pvt) Ltd. Lahore, ICBS Lahore attended this event. The webinar focus was the application of modern programming language in water resources sectors. Dr. Muhammad Shahid, Assistant Professor from NUST, Islamabad and Dr. Muhammad Waseem, Assistant Professor from CEWRE were the resource persons of the event.



Picture of MATLAB application during webinar

Webinar on Urban Stormwater Networks: Modeling and Design

On July 28, 2020, a one-day webinar “Urban Stormwater Networks: Modeling and Design” was organized by Dr. Ijaz Ahmad, Assistant Professor, CEWRE where 35 participants from various organizations such as Water and Power Development Authority (WAPDA), Integrated consulting Service (Pvt) Ltd. Lahore, Creative Engineering Consultant Peshawar, Soil Salinity Research Institute Pindi Bhattian, University of Agriculture Faisalabad, NUST Islamabad, University of Engineering and Technology Lahore, joined this virtual event to learn the stormwater modeling. Mr. Farhan Aziz from Saudia Arabia and Muhammad Ali Mirza from UET Lahore were the resource persons.



A glimpse of urban flooding in Lahore city



Schematic diagram of stormwater drainage system in urban environment

Webinar on Climate Change and Water

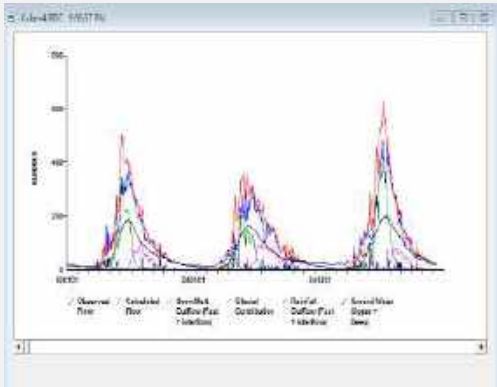
CEWRE conducted one-day webinar on August 25, 2020 titled “Climate Change and Water”. About 30 participants from various organizations joined the virtual event. The webinar focus was on water management under climate change. Dr. Zia ur Rehman Hashmi from Global Change Impact Study Centre (GCISC) Islamabad, and Dr. Mudassar Iqbal from CEWRE, UET, Lahore presented their lectures as key resource persons. The organizers of the webinar were Dr. Sajid Mahmood, Assistant Professor and Dr. Muhammad Waseem, Assistant Professor from CEWRE.



Enhanced frequency of extreme events (floods) in Pakistan requires serious measures of climate change

Webinar on Hydrological Modeling for Snow-Fed Catchment

Under the series of trainings on water resources engineering and management, a one-day webinar titled “Hydrological Modeling for Snow-Fed Catchment” was arranged by CEWRE on October 13, 2020. The webinar was arranged to enhance the capacity in application of available modern tools i.e. R language and University of British Columbia Watershed Model (UBCWm) for post-graduates students, researchers, and professionals of water related departments in hydrological modeling for better management of water resources. Dr. Muhammad Ashraf, Assistant Professor from KFUEIT and Dr. Mudassar Iqbal from CEWRE were resource persons. The event was organized by Dr. Ijaz Ahmad and Dr. Mudassar Iqbal.

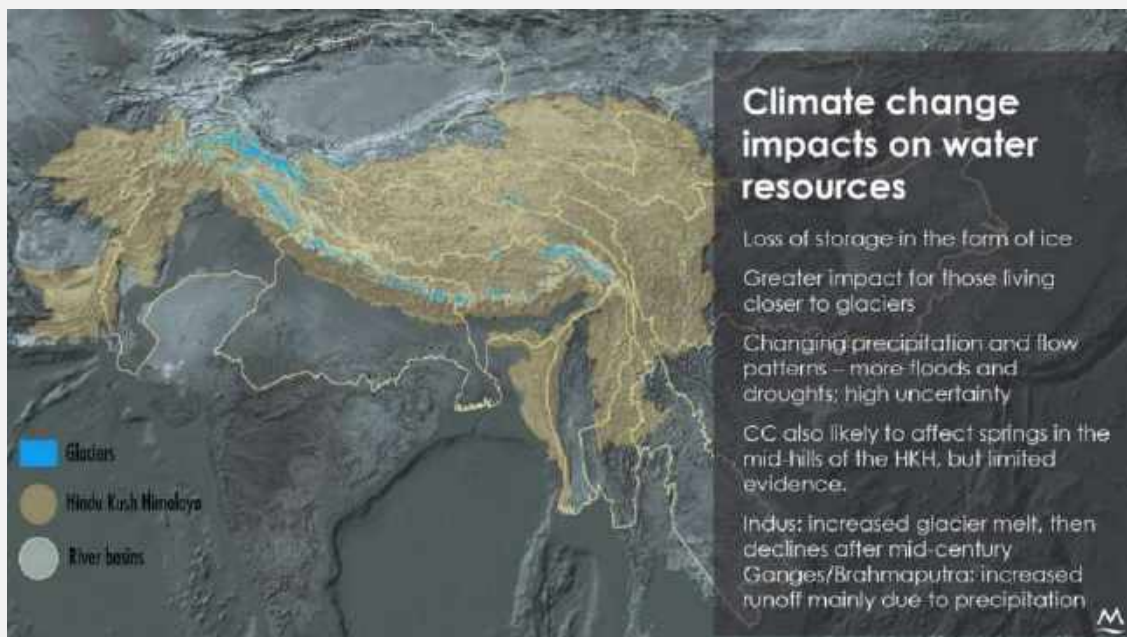


Snow fed catchment (on left) and UBCWm application during webinar (on right)

International Webinar on Climate Change and Water

Centre of Excellence in Water Resources Engineering (CEWRE) held an international webinar on Wednesday, December 02, 2020. Speakers from international and national institutes deliberated on Climate Change, its impact on water and ways to adapt the inevitable future scenarios. About 115 participation remarked across the region China, Myanmar, Nepal, Ethiopia, New Zealand, Egypt, Algeria in addition to Pakistan.

Prof. Dr. Habib ur Rahman, Dean Faculty of Civil Engineering, UET, Lahore, Pakistan, while delivering the opening remarks highlighted the importance of the seminar for dissemination of knowledge gathered at research institutes. Dr. Ghulam Rasul, Regional Manager at ICIMOD and former Director General of Pakistan Meteorological Department presented the effect of climate change on glaciers and snow melting and their consequent impact, on river flows in Indus Basin System. Dr. Jun Wen, Professor at Chengdu University of Information and Technology (CUIT), China presented the importance of earth observatory system, to observe the hydro-meteorological parameters for better prediction of future climate change scenarios, management of water resources and for improved decision making. Pakistan water resources challenges regarding climate change and the role of CEWRE was discussed by Prof. Dr. Noor Muhammad Khan, Director CEWRE, UET, Lahore, Pakistan.



Glimpse of Dr. Ghulam Rasul presentation

Dr. Lekhendra Tripathee, Research Associate Professor, NIEER, CAS, China emphasized on the impact of carbon carried by atmospheric air on glaciers melting and its effects on the stream water quality. From COMSATS University, Abbottabad Campus, Pakistan, Dr. Adnan Ahmad Tahir, Associate professor, talked on the river flows simulation under different Representative Concentration Pathway (RCP) scenarios. Video record of the webinar is available at “[CEWRE, UET, Lahore](#)” YouTube channel.



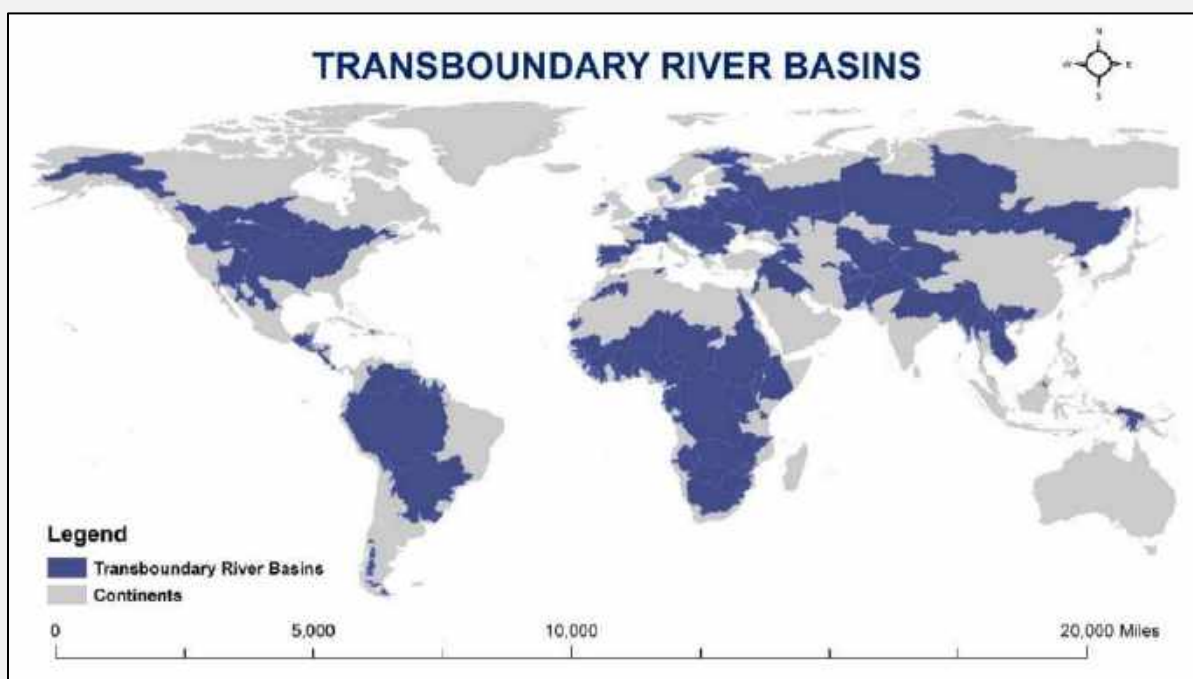
Glimpse of Dr. Lekhendra Tripathee presentation



International Webinar on Transboundary Water Management: Issues and Conflicts

Centre of Excellence in Water Resources Engineering (CEWRE) held an online international seminar on Wednesday, December 23, 2020. Speakers from international and national institutes delivered the talk on “Transboundary Water Management: Issues and Conflicts.” More than two hundred delegates from China, Nepal, Scotland, UK and Pakistan participated in the online event. While delivering the opening remarks, Prof. Dr. Habib ur Rahman, Dean Faculty of Civil Engineering, UET, Lahore, Pakistan, highlighted the importance of International Seminar. Dr. Noor Muhammad Khan, Director CEWRE, UET

Lahore, Pakistan presented his talk and explained the importance of transboundary river basins and the issues related to management of such basins across the globe. He emphasized the need of learning and replicating the good practices around the world such as Nile Basin, Danube Basin and Mekong Basins etc. Dr. Jahanzeb Masood Cheema, Associate Professor at Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi, Pakistan discussed the transboundary water in water security prospective for Pakistan. Engr. Naseer A. Gillani talk was focused on the water as human right and sign of peace. Professor Dr. Shaheen Akhtar from National Defence University, Islamabad explained the Indus Water Treaty in context of sustainable management of the Indus basin.



Picture of world transboundary river basins

Prof. Dr Arun Bhakta Shrestha, Regional Program Manager, ICIMOD, Nepal highlighted the need of regional cooperation through Upper Indus Basin Network (UIBN). Prof. Dr. Asit K. Biswas (Ex-Chief Executive, Third World Centre for Water Management, Mexico) discussed the myths of integrated water resources management and highlighted need of national level basin management and emphasized the improved country level water management. Lastly, Engr. Mehr Ali Shah, head Permanent Commission for Indus Waters, Pakistan explained the Indus Water Treaty in the historical prospective and informed the audience about current issues being forward by Pakistan in respect of Indus Water Treaty such as start of Indian sides projects without informing Pakistan and highlighted the comprehension of the treaty but at the same time national requirement of clarification required in some of the clauses of the Indus Water Treaty through neutral expert.



Transboundary rivers between Pakistan and India



Event picture of speakers, participant, and organizers

Research Activities

Drought and Agricultural Production Nexuses in Punjab: Historical Patterns, Spatiotemporal Variability and Probabilistic Projection

PROJECT COST: 2.67 Million



Dr. Muhammad Waseem
Principal Investigator

Dr. Ijaz Ahmad
Co-Principal Investigator



CEWRE is working on the subjected project funded by Higher Education Commission under National Research Program for Universities (HEC-NRPU). The project is focused to develop the understanding of sensitivity and variabilities in spatial patterns of drought. It could play a vital role for planning in case of regional shifts in production under projected climate change. More specifically, this information could provide assistance to stakeholders and policymakers in management and responses to drought at the field. At country levels outcomes of research project could help in predicting the negative impact of drought on agricultural yield, spatially and with ramifications for crop yield and food security in future.



Visual representation of drought

Performance Evaluation of Multiple Aerators Installed in Series at High Head Overflow Spillways: Case Study of Mohmand Dam

PROJECT COST: 7.7 Million



Prof. Dr. Noor M. Khan

Principal Investigator



Prof. Dr. Habib-ur-Rehman

Co-Principal Investigator

Dr. M. Kaleem Sarwar

Co-Principal Investigator



This project is funded by HEC under NRPU-2020. The objective of research project is to evaluate the performance of multiple aerators installed at high-head overflow spillway and developed the relationship of various hydraulic and geometrical factors affecting aerators spacing. For physical modeling Mohmand Dam's spillway model available at Irrigation research institute at Nandipur will be utilized for simulation of various scenarios. CFD model will be used for numerical testing of various scenarios.

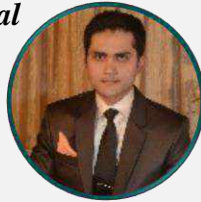


Physical Model of Mohmand Dam spillway at IRI Nandipur, Punjab, Pakistan

Optimal Design of Trash Rack to Reduce Head Losses for Small Hydropower Plants in Pakistan

Supervisor: Prof. Dr. M. Ashiq Kharal

Muhammad Ahsan
Latif
Student



Abstract:

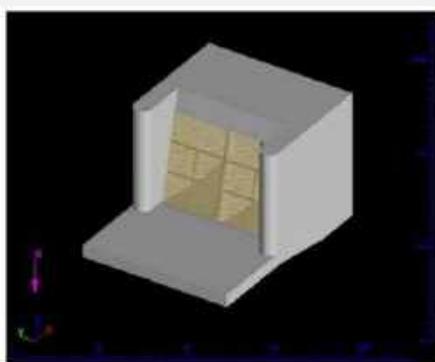
Trash racks are provided at the entrance of intake of hydroelectric power plants to restrict the floating and submerged debris, which could otherwise cause damage to downstream structures and malfunctioning of electromechanical equipments. Conventional approaches are still being used for the design of trash racks in Pakistan with main focus on structural criteria while little attention to the proper evaluation of hydraulic criteria, which leads to an increase in total hydraulic head loss in low head hydropower schemes with integral intake. Several formulas have been published in the past to anticipate this loss of hydraulic head. However, practice shows that the

head losses calculated with these formulas are often by far lower than the losses that practically occur. The reason for this is the fact that the formulas simplified correlations do not take into account all the relevant loss parameters. This research aimed to derive new equation for optimal design of trash rack to reduce head losses for small hydropower plants in Pakistan. A comprehensive literature has been reviewed in this study regarding the design and hydraulics of intake trash racks and CFD modeling. The low head hydropower facilities have been visited as well to conduct visual inspections and to collect relevant information about factors which mainly contributes to design of trash racks. In order to derive new equation for optimal design of trash rack, sets of simulations have been performed in Flow 3D for trash rack of Nandipur Hydropower Plant.



A typical trash rack

Trash rack models with different bar spacing, inclination and blockage ratio have been simulated corresponding to varying approach velocity. The results indicated that the head loss through trash rack increases with increasing approach velocity, inclination angle of rack with channel bed, and blockage ratio. The results of head loss from Flow 3D modelling for numerous configurations have been fitted by a new equation that take into account all these influential parameters. Comparison of newly derived equation with existing equations has also been made in this study which validates the new equation for application in small hydropower plants of Pakistan.



Geometry of Trash Rack in Flow-3D

Hydraulic Simulation Flow Over Domeli Dam Spillway Model

Supervisor: *Prof. Dr. Habib-ur-Rehman*

Student: *M. Haris Asghar Khan*

Abstract:

Spillway is one of the important structures in dam that ensures the safe removal of flood water towards the downstream. The excessive water is transferred through spillway so that the dam can be preserved through overtopping and controls the flow. Spillway can be a part of a dam or can be provided separately depending upon the site conditions for the dam construction. Regime of flow in spillway is subcritical at upstream and super-critical at the face. As the flow conditions are rapidly varied in the spillway so it is difficult to check the hydraulic conditions of the spillway. In spillway design, the discharge capacity should be properly investigated as it is the main reason for the failure of the dam's spillway. Small dams are an

important source of both primary and productive water for rural communities. Domeli dam is one of the small dam situated in Punjab province of Pakistan, which was designed against flood of 1185 cumecs. Unfortunately, dam's spillway was failed and its chute and stilling basin were severely damaged/washed away in 2015.

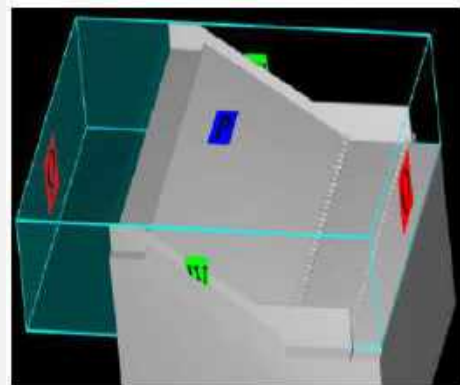


Damaged Stilling Basin of Domeli Dam

In 2015 a severe flood of 1427 cumecs was reported through investigation of past flood marks. It was learnt that there was an obstruction on downstream of the stilling basin, which might have caused the backwater flow, whirlpool etc. due to which shear stresses might have gone beyond the permissible limit. Domeli Dam spillway severely damaged due to any of the following reasons: high discharge of 1427 cumecs whereas its capacity was 1185 cumecs,

hydraulic shear stresses, downstream obstruction, poor energy dissipation system and cavitation problem.

So, there was a need to investigate the flow parameters over the Domeli dam spillway to investigate the most likely cause of the failure. iv In the present study, the flow characteristics of Domeli dam spillway were investigated using CFD modelling. The engineering drawings have been converted into 3 dimensional drawings for the preparation of geometry in the model. These 3- dimensional solid objects have been converted into stereo lithography files (.stl) which have been used as geometry files in Flow-3D model. Flow-3D was well validated for flow depths as the difference between simulated and observed values calculated to be 8.5%.



Geometry of Domeli Dam Spillway in Flow-3D

Computational fluid dynamics model had successfully estimated the flow characteristics of Domeli dam spillway and is recommended for future similar studies. Also, the energy dissipation system was found adequate as Froude number decreased significantly over the spillway and about 70% of energy was dissipated which is efficient enough.

Ascertaining the Distinctive Role of Climate Change and Land of Haro River Basin

Supervisor: *Dr. Muhammad Waseem*

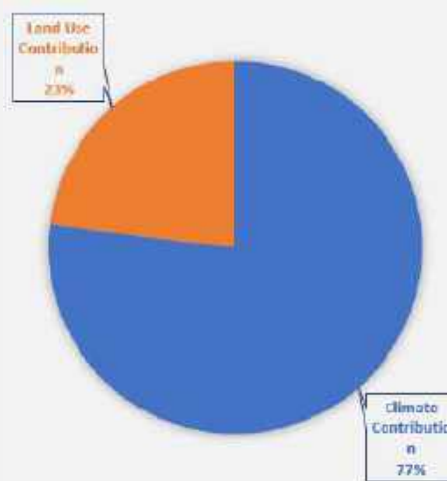
Abdul Rehman
Student



Abstract:

Climate changes and anthropogenic activities e.g. land use changes are two key factors that may influence the hydrological process of a basin. Hence, assessment of relative contribution of these factors in runoff variation is essential for basin development and mitigative activities. The current study

focuses on the estimation of runoff variation induced by climate change and land use change using Man-Kendall test, Pettit test and Budyko Framework. The trend analysis results showed 0.83% decrease in depth of annual precipitation and 0.11% increase in annual potential evapotranspiration. Pettit test indicated a change point at 1998 and based on change point, the study period was divided into pre-change period (1988-1997) and postchange period (1998-2018). Furthermore, Budyko Framework analysis depicted the significant decrease in runoff from pre-change period to post-change period with 77% and 23% relative contribution of climate change and land use change respectively.



Graphical representations of Climate and Land Use Change Contribution

The cross assessment of supervised land use classification of satellite images also seconded the major land use variations during the post change period. This study also concludes that aforementioned methods performed well in quantifying the relative contribution of land use change and climate change to runoff change.

Investigation of Variability in Hydrologic Extreme Events Over Upper Indus River Basin

Supervisor: *Dr. Ijaz Ahmad*

M. Shahzad Ashraf
Student

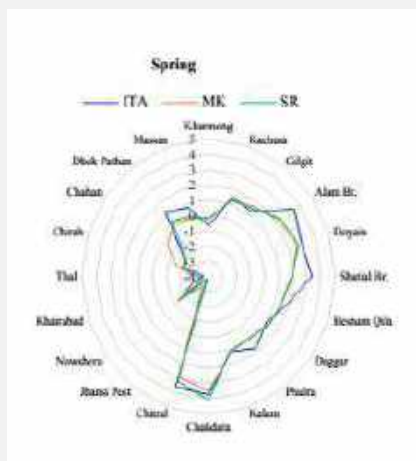
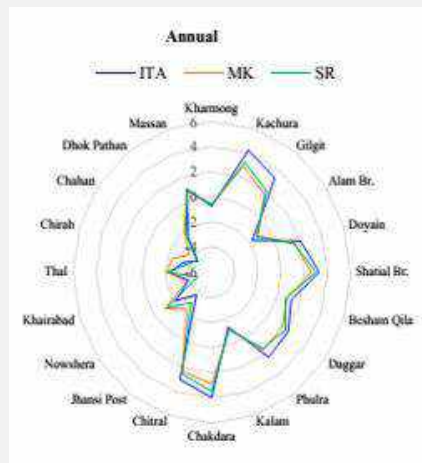
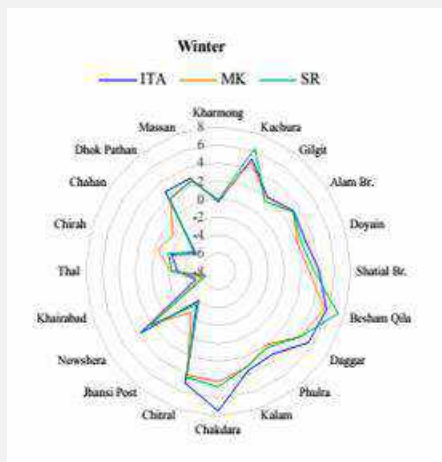
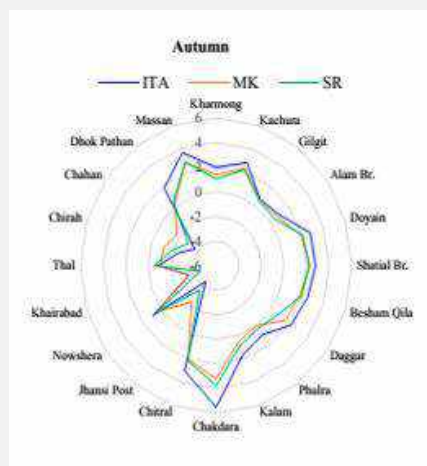
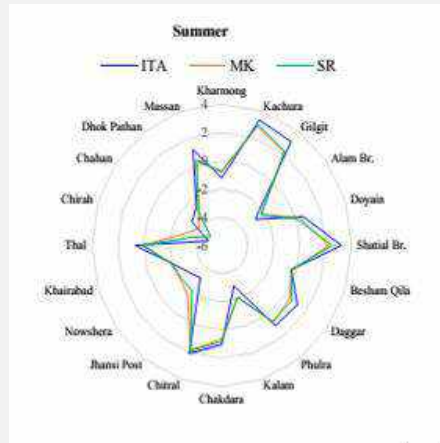


Abstract:

Pakistan is a water stressed country and its available water resources are highly vulnerable to fluctuating climatic conditions. Investigation of streamflow variability is considered essential in providing the requisite assistance in the planning and management of agriculture, water

conservation and hydropower projects. Therefore, present study investigates the variations in the monthly, seasonal and annual streamflow timeseries at twenty (20) stations over the upper Indus river basin (UIRB) by using Mann-Kendall (MK), Spearman's rho (SR) and innovative trend analysis (ITA) methods. Moreover, variations in extreme flows were investigated by separating the daily streamflow timeseries into two categories; extremely low (< 10th percentile) and extremely high (> 90th percentile) flows. At the monthly scale, 240 timeseries were investigated out of which 134, 138 and 159 timeseries exhibited significant trends by using MK, SR and ITA methods, respectively. Whereas, seasonal and annual flows showed significant trends over 57, 62 and 75 timeseries based on MK, SR and ITA methods, respectively. Extremely low flows manifested significant increasing trends over seven (07) stations and significantly decreasing trend over three (03) stations whereas, only one (01) station exhibited significant increasing and four (04) stations significantly decreasing trends for

extremely high flows. Therefore, it may be concluded that the variations in the extremely low flows will be more pronounced compared to extremely high lows in the future. This may constitute constant pressure on water resources availability in the lower Indus plains where most of the country's population is dependent on agricultural activities. It is believed that the results of this study could help understand streamflow variability over UIRB and will have imperative insinuations for further studies.



Comparison of trend results using MK, SR and ITA methods in seasonal and annual timeseries.

Spatial Distribution and Drought Monitoring in Pothwar Region using Satellite Based Drought Indices and Geo-informatics Techniques

Supervisor: *Dr. Ghulam Nabi*

Waqar Haider

Student

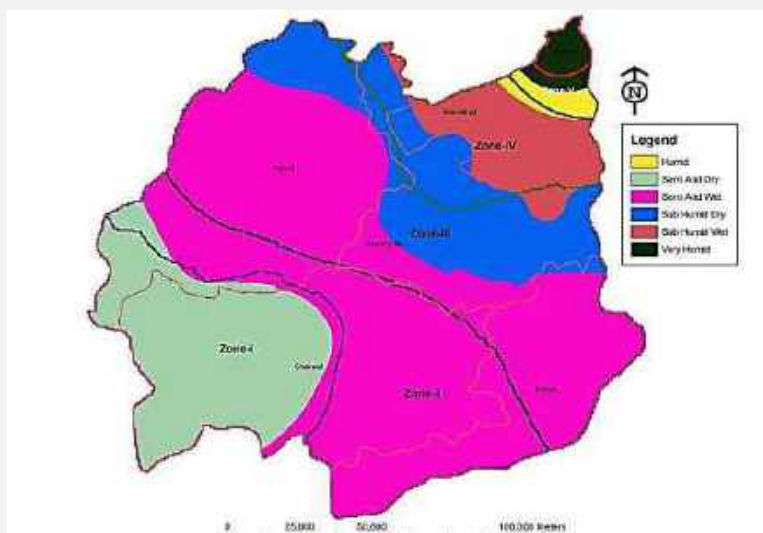


Abstract:

Drought is a devastating natural disaster which is caused by changes in rainfall as it does not occur at the expected time and place. This leads to prolonged changes in vegetation cover as well as in the hydrological cycle especially with reduction in soil moisture, surface runoff and groundwater recharge. Pakistan has been subject to severe droughts responsible for poor agricultural performance especially in the rainfed areas. This study was therefore focused on understanding the temporal and spatial variation of droughts from 1985 to 2019 in the rainfed area of Pothwar Plateau (23160 km²) lying the Punjab province of

Pakistan. Pothwar consists of four major districts of the country; Chakwal, Attock, Rawalpindi, and Jhelum. To understand the extent and duration of drought the remotely sensed satellite data, precipitation data and flow data were used. Precipitation maps were developed by using 34-year average rainfall data and was divided in to six zones on the basis of annual rainfall. The drought indices Standardized Precipitation Index (SPI), Stream Flow Index (SDI), and Normalized Difference Vegetation Index (NDVI) were used to estimate the drought and to track its temporal and spatial variation. The SPI and SDI were calculated using the Drin C software while NDVI was estimated using RS and GIS techniques. The SPI variation indicated that majority of droughts (92.3%) during the study period were mild and moderate droughts, whereas 7.7% were categorized as severe droughts. During the study period Chakwal and Attock were highly drought prone areas as compared to Rawalpindi and Jhelum. In Chakwal and Attock there was higher occurrence of severe and extreme droughts when

compared with Rawalpindi and Jhelum. v According to SDI, the 12-month hydrological drought assessment indicated severe droughts from 1990-2010 for the Soan river at Chirah bridge and at Dhok Pathan from 1989-2006. NDVI indicated deforestation and barren land has increased in the Pothwar region. Increasing deforestation and urbanization was further complicated by decrease in dense vegetation during 1990-2019 in Pothwar. On the basis of spatial precipitation analysis, it is concluded that 19% of total Pothwar region in Chakwal and Attock districts was most drought prone area of the region while mild drought occurred area in Rawalpindi and Jhelum districts which is 2% of the area.



Drought Conditions In Different Zones of Pothwar

**Accelerated
Groundwater Recharge
through Proposed
Infiltration Galleries in
Model Town, Lahore**

Supervisor: *Prof. Dr. Habib-ur-Rehman*

*Muhammad Fahim
Aslam*

Student



Abstract:

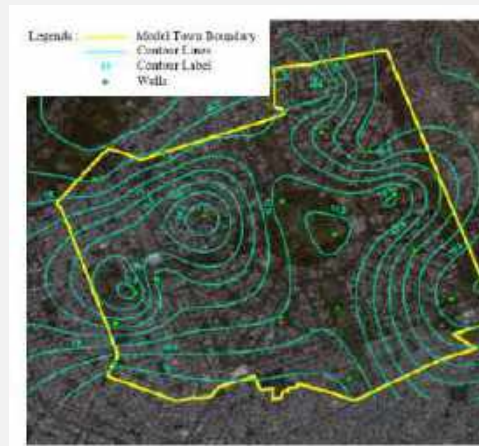
Lahore is the provincial capital of Punjab and second biggest city of Pakistan with respect to the population. Average annual population growth of Lahore is 4.14% from 1998-2017, which is much higher than the average population growth rate of Pakistan which is 2.4 %. According to various past studies, average

annual groundwater depletion rate of Lahore is 1.07 m/year. This rate of recession is alarming and will lead to water shortage in near future depriving the occupants from the underground source of water. As with the growth of population new housing societies are being built to accommodate the burgeoning population. When housing societies are launched, causes huge increase in impermeable areas, thus reduces the groundwater recharge. Moreover, pumping to fulfill the water requirements of the occupants further worsen the groundwater depletion rates. These societies are launched without any detailed designing and basic requirements from environment point of view. One among them is groundwater hydrological balances in the society areas. These societies increase impermeable areas, pump huge amount of groundwater from the underground water source and do nothing for recharging of the aquifer. No body considers groundwater hydrology balance before launching a society. It is the main issue of developing countries like Pakistan. There should be means and base so that minimum

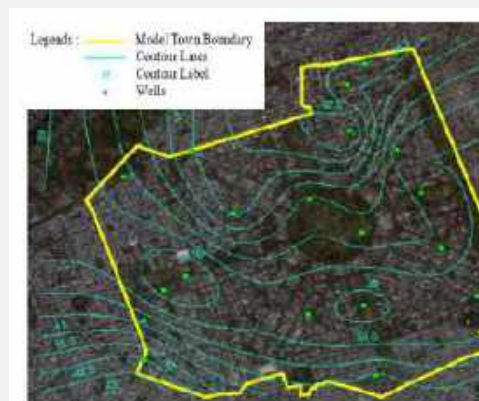
imbalance takes place. There should be sustainability in water pumping through water recharging. Therefore, it is necessary to find out alternative means to recharge the groundwater aquifer of Lahore. There are many techniques which are used worldwide to recharge the groundwater like recharge wells, rain gardens, permeable pavements, infiltration galleries etc., among them infiltration galleries are most effective. Therefore, in the present study, role of infiltration galleries to accelerate the groundwater recharge in the Model Town area of Lahore was investigated. In order to investigate the present situation of groundwater table, temporal/spatial distribution was plotted on ArcMap. HEC-HMS was used for the calculation of discharges, the Model was verified with the observed flood value of 1996. Groundwater model prepared on Visual MODFLOW was calibrated and validated for the data years 2000-2008, 2010-2018 respectively. The calibrated model showed a close agreement between observed and simulated heads. The results indicate that due to overexploitation water levels

continue to decrease with the passage of time. The average simulated water table decline rate was computed as 1.1 m/year in the study area. So in order to overcome this alarming water table declining rate, infiltration galleries were proposed and designed for the study area. These galleries were designed according to the stormwater best management manuals (IDEQ). They were incorporated in the model prepared on Visual MODFLOW and their effect was studied. It was seen infiltration galleries that these allow recharging the groundwater at better rate. Model results showed that with infiltration galleries the average depletion rate of groundwater reduces to 0.8 m/year. The study concludes that the Infiltration Galleries have a potential to recharge the groundwater at good rate, therefore, installation should be considered to least disturb the groundwater hydrological balance in the society. Author of the thesis strongly recommend that no housing society should be approved by the relevant city development authorities without

availability of the sound groundwater hydrological balance study and provision of some groundwater recharging mechanism.



Spatial Distribution of Groundwater Depth (Year 1991)



Spatial Distribution of Groundwater Depth (Year 2018)

Assessment of Groundwater Recharge Potential and Recharge Zones in Punjab, Pakistan

Supervisor: *Dr. Ghulam Nabi*

Muhammad Afzal
Student



Abstract:

Groundwater is the most valuable natural resource that plays a vital role in all aspects of life. Pakistan is an agriculture country and about 80% water is used for agriculture. Due to increase population and cropping intensity water demand has increased. Surface flows are reducing and groundwater is used to fulfill the need of crop growth. Due to this, Punjab is currently experiencing groundwater stress. Groundwater is declining day by day due to over abstraction and with less aquifer recharge. Better management practices and artificial recharge is needed for sustainable groundwater resources. The aim of this study was to delineate and classify the groundwater recharge capacity and recharge zones using

GIS and RS. Nine multi-influencing parameters such as rainfall, geology, soil, land use land cover, lineaments, slope, topographic wetness index, aspect and drainage density were used to estimate the groundwater recharge capacity. Thematic map of all these parameters were generated using Landsat ETM data. The multilayers reclassification was done based on previous studies and the parameter weights were assigned according to Saatty's scale in AHP. The piezometric data analysis showed that out of 2350 piezometer, 1790 piezometer showed a decline in water level and 560 piezometer showed a rise in water level. The parametric analysis showed that the rainfall was the most influential factor and had weightage of 22.84%. The groundwater recharged capacity map was classified into five categories. The result showed that 3.02%, 46.76%, 22.63%, 22.17% and 5.43% areas were suitable for least, low, moderate, good and high groundwater recharge capacity zone respectively. The results were validated by the reservoir operation curve and show 0.71 correlation with groundwater recharge capacity map. The map developed for recharge capacity can be used as base line to carry out groundwater recharge activities in Punjab.

Approved Research Proposals of Postgraduate Studies

Sr. No.	Research Topic	Supervisor	Postgraduate
1	Characteristic of Hydro-Geochemical Parameters for Sustainable Groundwater Management Using Isotopic and Numerical Techniques	Dr. Ijaz Ahmad	Usman Iqbal
2	CFD modeling of stilling basin of Mohmand Dam Spillway	Dr. Muhammad Kaleem Sarwar	Fareena Fatima
3	Modeling Glacial Lake Outburst Flood Impacts on Shogo-Sin Hydropower Project and Settled Areas	Dr. Muhammad Kaleem Sarwar	Muhammad Ahsan
4	Formulation of a GIS-Based Decision Support System for the Appropriate Adoption of Crops and Irrigation Techniques	Dr. Ijaz Ahmad	Muhammad Naeem Zia
5	Assessment of satellite base Evapotranspiration Production at regional scale over landscape of Pakistan	Dr. Muhammad Waseem	Nauman Zahid Khan
6	Optimal Design and Rehabilitation of Urban Storm Drainage System	Dr. Ghulam Nabi	Ahmad Raza.

Approved Research Proposals of Postgraduate Studies

Sr. No.	Research Topic	Supervisor	Postgraduate
7	Estimation of Interrill Erosion & Runoff and Effects of Different Rainfall Pattern on it	Dr. Muhammad Masood	Muhammad Waqas
8	Urban Flood Risk Mapping	Dr. Muhammad Masood	Anees ul Mustafa
9	Evaluation of Urban Drainage System at Different Rainfall Characteristics and Simulation of Low Impact Development (LID) Techniques for Flood Mitigation	Dr. Ijaz Ahmad	Hassan Ali
10	Analyzing the Sensitivity of Runoff to Different Climatic Parameters using Budjko Framework	Dr. Muhammad Waseem	Muhammad Sufyan
11	Assessment of River Regime of Chenab River in Post Chiniot Dam Project Secenario	Dr. Muhammad Kaleem Sarwar	Saleem Munawar

Publications

Journal Publications

1. Mehmood Z., N.M. Khan, Sadiq S., Mandokhail S.J., Ashiq S.Z. (2020) Assessment of subsurface lithology, groundwater depth, and quality of UET Lahore, Pakistan, using electrical resistivity method, *Arabian Journal of Geosciences*, 13(281)
2. Yasir A., N.M. Khan, H. ul. R. Mughal, Mahmood K. (2020) Assessing inflow variability at Rim Stations of Indus Basin Irrigation System, *Irrigation and Drainage*, 69, pp. 997-1011, <https://doi.org/10.1002/ird.2497>
3. Nabi G., Hussain F., Wu R.S., Nangia V., Bibi R. (2020) Micro-Watershed Management for Erosion Control Using Soil and Water Conservation Structures and SWAT Modeling, *Water*, 12(5), 1439; <https://doi.org/10.3390/w12051439>
4. Sibtain M., Li X., Nabi G., Azam M.I., Bashir H. (2020) Development of a Three-Stage Hybrid Model by Utilizing a Two-Stage Signal Decomposition Methodology and Machine Learning Approach to Predict Monthly Runoff at Swat River Basin, Pakistan, *Discrete Dynamics in Nature and Society*, 2020, 5676; <https://doi.org/10.1155/2020/7345676>
5. Saddique, Q., M.I. Khan, M.H. Rehman, X. Jiattun, M. Waseem, Ahmad I., et al. (2020) Effects of Elevated Air Temperature and CO₂ on Maize Production and Water Use Efficiency under Future Climate Change Scenarios in Shaanxi Province, China, *Atmosphere*, 11(843): 1-20, <https://doi.org/10.3390/atmos11080843> [IF: 2.397]
6. Shakoor, A., Z.M. Khan, H.U. Farid, M. Sultan, Ahmad I., N. Ahmad, M.H. Mahmood, M.U. Ali (2020) Delineation of regional groundwater vulnerability using DRASTIC model for agricultural application in Pakistan, *Arabian Journal of Geosciences*, 13(4), 195, <https://doi.org/10.1007/s12517-020-5161-y> [IF: 1.327]

7. Shahzad, H., H.U. Farid, Z.M. Khan, Muhammad Naveed Anjum 2, Ahmad I. 3, et al. (2020) An Integrated Use of GIS, Geostatistical and Map Overlay Techniques for Spatio-Temporal Variability Analysis of Groundwater Quality and Level in the Punjab Province of Pakistan, South Asia, *Water*, 12(12): 3555, <https://doi.org/10.3390/w12123555> [IF: 2.544]
8. Yaseen, M., M. Waseem, Y. Latif, M.I. Azam, Ahmad I., S. Abbas, M.K. Sarwar, et al. (2020) Statistical Downscaling and Hydrological Modelling based Runoff simulation in Transboundary Mangla Watershed Pakistan, *Water*, 12(11):1-21, <https://doi.org/10.3390/w12113254> [IF: 2.544]
9. Ehtsham, M., M. Waseem, Ahmad I., N.M. Khan, S. Chen (2020) Satellite precipitation product: Applicability and accuracy evaluation in diverse region, *Science China Technological Sciences*, 62:1-10, <https://doi.org/10.1007/s11431-019-1457-3> [IF: 2.302]
10. Dai, W., A. Bilal, Q. Xie, Ahmad I., I. Joshi (2020) Numerical Modeling for Hydrodynamics and Near-Surface Flow Patterns of a Tidal Confluence, *Journal of Coastal Research*, 36(2): 295-312, <https://doi.org/10.2112/JCOASTRES-D-19-00058.1> [IF: 0.790]
11. Iqbal, U., Ahmad I., M. Zaman, N.M. Khan, M.K. Sarwar (2020) Performance Evaluation of Micro Sprinkler Irrigation System in Tunnel Farms and Open Area Conditions, *Fresenius Environmental Bulletin*, [IF: 0.553]
12. Zaman, M., Ahmad I., M. Usman, M. Saifullah, M.N. Anjum, M.I. Khan, M.U. Qamar (2020) Event-Based Time Distribution Patterns, Return Levels, and Their Trends of Extreme Precipitation across Indus Basin, *Water*, 12(12), 1-31, <https://doi.org/10.3390/w12123373> [IF: 0.553]

13. Yaseen, M., Ahmad I., J. Guo, M.I. Azam, Y. Latif (2020) Spatiotemporal variability in the hydro-meteorological time-series over upper Indus river basin of Pakistan, *Advances in Meteorology*, 2020:1-18, <https://doi.org/10.1155/2020/5852760> [IF: 1.491]
14. Waseem, M., Ahmad I., A. Mujtaba, M. Tayyab, C. Si, H. Lü, X. Dong (2020) Spatiotemporal Dynamics of Precipitation in Southwest Arid-Agriculture Zones of Pakistan, *Sustainability*, 12(6): 1-18, <https://doi.org/10.3390/su12062305> [IF: 2.576]
15. Ashraf, M.S., Ahmad I., N.M. Khan, F. Zhang, A. Bilal, J. Guo (2020) Streamflow variations in monthly, seasonal, annual and extreme values using Mann-Kendall, Spearman's rho and innovative trend analysis, *Water Resources Management*, 232, <https://doi.org/10.1007/s11269-020-02723-0> [IF: 2.924]
16. Waseem, M., Shahid, M., Khan, N. M., Si Chen, (2020) Hydrological drought indexing approach in response to climate and anthropogenic activities, *Journal of Theoretical and Applied Climatology*, 141(3-4), DOI: 10.1007/s00704-020-03227-y
17. Ajmal, M., Waseem, M., Kim, D., Kim, T.U., (2020) A Pragmatic Slope-Adjusted Curve Number Model to Reduce Uncertainty in Predicting Flood Runoff from Steep Watersheds, *Journal of Water*, 12(5):1469, DOI: 10.3390/w12051469
18. Abbas, A., Waseem, M., Yang, M. (2020) An ensemble approach for assessment of energy efficiency of agriculture system in Pakistan, *journal of Energy Efficiency* 13(3), DOI: 10.1007/s12053-020-09845-9
19. Raza, A., Shah, S. A. R., Khan, M. M., Haq, F. ul, Arshad, H., Farhan, M., Waseem, M. (2020) Axial Load-carrying Capacity of Steel Tubed Concrete Short Columns Confined with Advanced FRP Composites, *Periodica Polytechnica Civil Engineering*, 64(3), pp. 764-781, <https://doi.org/10.3311/PPci.15199>

20. Raza A., Raheel Shah S. A., Haq F. ul, Arshad H., Raza S. S., Farhan M., Waseem M. (2020) Prediction of Axial Load-Carrying Capacity of GFRP-Reinforced Concrete Columns through Artificial Neural Networks, *Structure*, 28 (2020), pp. 1557–1571, <https://doi.org/10.1016/j.istruc.2020.10.010>
21. Raza A., Rafique U., Haq F. ul, (2020) Mechanical and Durability Behavior of Recycled Aggregate Concrete Made with Different Kinds of Wastewater, *Journal of Building Engineering*, 34, <https://doi.org/10.1016/j.job.2020.101950>

Conference Publications

1. Haq, F., M. Waseem, Ahmad I., A.Q. Butt (2020) Assessment of subsurface lithology and groundwater depth using ERT in Rawalpindi, Pakistan, 1st online International Conference on Advances in Management and Technology, Sadabai Raisoni Women's College, Nagpur, India, November 6-7, 2020.
2. Ahmad I., N.M. Khan (2020) Second Stage Stilling Basin as a Solution for Chashma Barrage due to Damage Caused by Retrogression Phenomenon, 2nd Conference on Sustainability in Civil Engineering, Capital University of Science and Technology, Islamabad Pakistan, [Paper ID: 20-408].
3. Ijaz Ahmad (2020) The Chiniot Dam – Sheet Pile Design Aspect, 2nd Conference on Sustainability in Civil Engineering, Capital University of Science and Technology, Islamabad Pakistan, [Paper ID: 20-409]
4. Ahmad I., F. Haq (2020) Provision of Subsidiary Weir as a Solution for Damages Caused by Retrogression at Jinnah Barrage, 2nd Conference on Sustainability in Civil Engineering, Capital University of Science and Technology, Islamabad Pakistan, [Paper ID: 20-410].

Study Tours

Study Tour of Mangla Dam

Study tours are very essential for practical exposure toward the better understanding of subject. Centre of Excellence in Water Resources Engineering (CEWRE) arranged the study tour to Mangla Dam for postgraduate students on November 18, 2020. Fifteen students from Water Resources Engineering and Hydropower Engineering Disciplines joined the study tour. Engr. Ashraf Khokhar, Senior Engineer at Mangla dam explained the importance and main features of Mangla Dam during the visit. The participants visited the Mangla Dam embankment, spillway, powerhouse, and museum.



Mangla Reservoir



Group photo of students with CEWRE teachers and officials of Mangla Dam Project at Mangla Reservoir location

Study Tour of ISRIP, WAPDA, Lahore

A study tour of International Sedimentation Research Institute, Pakistan (ISRIP) WAPDA arranged by CEWRE. More than twenty students of Sediment Transport and River Engineering classes joined the study tour. Bambawali Ravi Bedian Canal (BRBD) location was selected for practical demonstration of sediment sampling in field. The objective of tour was to demonstrate the sediment sampling methods and different apparatus for sediment analysis.



Photo of Students Group performing sediment sampling



Group Photo of Students at BRBD

Facilities Upgradation

CEWRE has upgraded many facilities in year 2020 for providing better research environment to postgraduate students and researchers. Major Facilities upgraded include:

(A) CEWRE Website

Today in fast pace environment well design web portal is the face of an organization. CEWRE website (www.cewre.edu.pk) has been updated and made more informative and updated more frequently. Website needs further improvements and will be done on continuous bases.



Screenshot of CEWRE website

(B) Library

More than 15000 collection of books, thesis, documents, reports, research papers and conducive environment of sitting for 15-20 persons make the CEWRE's library a unique feature of the Centre. Continuing CEWRE Vision to share the knowledge with national and global water professionals, CEWRE has taken the initiative to digitize the exiting collection in library for knowledge seekers. Online Public Access Catalogue for users are in process while abstracts of various research works are available at library webpage (<http://www.cewre.edu.pk/web/library/>).



Screenshot of library web page

CEWRE has also purchased the new books on various topics to provide and familiarize the researchers with new and advanced knowledge. New arrivals at library during year of 2020 are:

Description	Publisher
Hydrology and water resources engineering. 2 nd ed.	Narosa Publishing
Waterpower engineering. 2 nd ed.	IBH India
Manual of soil and water conservation practices.	IBH India
Stochastic processes for water scientist's development and application.	John Wiley
Urban hydrology hydraulics, and storm water quality engineering applications and computer modelling	John Wiley
Modeling hydrologic change: statistical methods	CRC press
The economics of hydroelectric power new horizons in environmental economics	Edward Elgar
Sedimentation engineering. ASCE manuals and reports of engineering practice	ASCE
Open channel hydraulics	Elsevier
Stream hydrology: An introduction for ecologist 2 nd ed.	John Wiley
Climate variations, climate change and water resources engineering	Cambridge University
Hydrology and water resources engineering 2 nd ed.	Narosa
Geographic information systems in water resources engineering	CRC press
Groundwater hydrology	PHI

Description	Publisher
Water and wastewater systems: Source treatment, conveyance and disposal	S.K. Kataria
Water power engineering 2 nd edition	Vikas Publishers
Elements of physical hydrology. Baltimore	JHU
Tran's boundary water management and the environmental 3 rd ed.	Earthscan
Soil and groundwater pollution	Syrawood
Irrigation and water management	Syrawood
Manual of soil and water conservation practices	Oxford & IBH
Hydraulics. In SI units	S. K. Kataria & Sons
Water resources systems planning and management	Springer
Flood monitoring through remote sensing. Springer remote sensing photogrammetry	Springer
Proceedings of the international water technology workshop	NUST

(C) GIS and RS lab

Modern labs are need of time to conduct the advance research. Understanding the requirement of digital era CEWRE has upgraded its GIS and RS lab with ten highspeed desktop computers for student's research.

(D) Classrooms

CEWRE upgraded the classrooms to provide student a conducive environment during lectures. Smart screens were installed in two classrooms to replace the projectors. It has high-definition display with touch screen of 70 inches.



Mounted smart screen in classroom

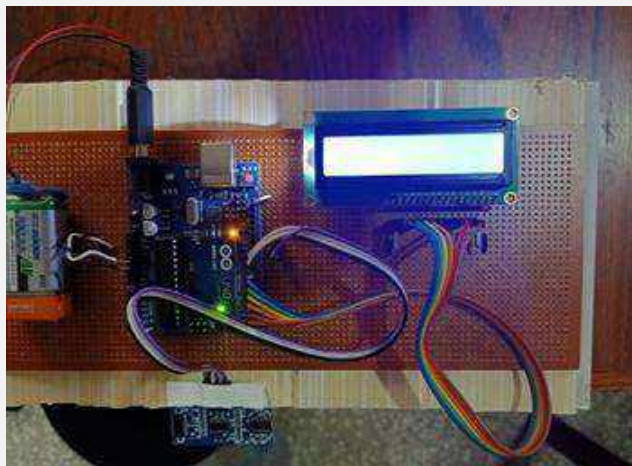
(E) Model Tray (MT) Hall

MT hall is used to conduct research on scaled down physical models. A physical model of Mohmand Dam spillway was constructed to study the roster tail creation on spillway. MT hall has Tow Trolley for current meter calibration which is one of its kind in Pakistan. In year 2020 Tow trolley was repaired to perform the calibration of modern hydrometry instrument name acoustic doppler current profiler (ADCP).



View of Model Try Hall

CEWRE staff has developed water level sensor using Arduino UNO to measure the real time water level without contacting the water surface. Sensor works on the principle of ultrasonic wave which emits high frequency sound wave at regular intervals, and waves travel through the medium at velocity of sound and reflected from the object placed within the sensor range as echo



Ultrasonic Water Level Sensor

signals. Sensor microprocessor computes the travel time between emitted signal and received echo as voltage which is directly proportional to the distance between water surface and sensor.

Sports Activities

Sports Activities During the Year 2020



Games Played

- Cricket
- Football
- Badminton
- Table tennis
- Chess
- Carrom Board
- Ludo

Sport coordinator Dr. Muhammad Waseem, Assistant Professor, played key role in successful conduct of sports week and got appreciation from Centre's management.



Appointments & Retirements

Faculty



Dr. Mudassar Iqbal
Lecturer



Engr. Faraz Ul Haq
Lecturer



Engr. M. Awais Zafar
Lecturer

Supporting Staff



Ms. Iqra Irfan
Assistant Librarian



Ali Raza Asif
Lab Supervisor



Awais Zubair
Junior Technician



Aizaz Ahmad
Junior Clerk



Ms. Sundas Adrees
Junior Clerk



Muhammad Khalil
Driver



Muhammad Akbar
Security Guard



Muhammad Ramzan
Security Guard



Amir Shahzad
Gardener



Irfan Masih
Sweeper

New Appointment

Faculty Profile



Dr. Mudassar Iqbal

Dr. Mudassar Iqbal has joined the CEWRE on March 25, 2020, as a Lecturer on contract; he obtained his Ph.D. in year 2018 from Northwest Institute of Eco-Environmental and Resources, University of Chinese Academy of Sciences, China. Dr. Mudassar's area of interests are quantifying and analyzing the impacts, as well as the vulnerabilities created by climate change, in relation to water resources and its adaption to water resources projects.



Engr Faraz ul Haq

Engineer Faraz ul Haq has joined the CEWRE on March 11, 2020, as a Lecturer on contract. He completed his M.Sc. degree in Civil Engineering from University of Engineering and Technology, Taxila in year 2018. His area of interests are groundwater, transboundary water management and geophysics.



Engr Muhammad Awais Zafar

Engineer Muhammad Awais Zafar has joined the CEWRE on September 16, 2020, as a Lecturer on contract. He graduated from Centre of Excellence in Water Resources Engineering, University of Engineering and Technology Lahore in year 2018. Engineer Muhammad Awais Zafar's area of interests are flood modeling, hydrological and hydraulics Modeling, and hydrometry.

Supporting Staff Profile

Mr. Ali Raza Asif

Mr. Ali Raza Asif joined the CEWRE on June 19, 2020, as a Lab Supervisor. He obtained his Bachelor's degree in BSc Electrical Engineering & Technology and has an experience of 10 years.

Mr. Awais Zubair

Mr. Awais Zubair joined the CEWRE on September 17, 2020, as a Junior Technician. He has degree of B.Tech (Hon) in Mechanical and has overall 10 years of experience in various industrial sectors.

Miss Iqra Irfan

Miss Iqra Irfan joined the CEWRE on dated July 01, 2020 as Assistant Librarian. She obtained her Master's degree in Library & Information Science and has an overall experience of 9 years.

Mr. Aizaz Ahmad

Mr. Aizaz Ahmad joined the CEWRE on June 01, 2020 as a Junior Clerk in computer section. He obtained his Bachelor's degree in Information Technology from Punjab University.

Miss Sundas Adrees

Miss Sundas Adrees joined the CEWRE in 2020 as a Junior Clerk in administration section. She has a Master's degree in Islamic Studies.

Retirement

Mr. Mukhtar Ahmad

Mr. Mukhtar Ahmad retired from CEWRE on December 31, 2020, after a service of 35 years. During the service he served at numerous positions in CEWRE such as laboratory Assistant and Lab attendant in hydraulic labs, Electronics Lab and Model Try hall. He also served as caretaker of CEWRE hostel name Bilal Hall. A farewell ceremony was arranged on the day of his retirement. All faculty members including the Director CEWRE and staff had joined the ceremony, shared memories and wished him a happy life.



Group photo of faculty and Prof. Dr. Atta ur Rehman Tariq (senior retired faculty member, 7th from right) at farewell of Mr. Mukhtar Ahmad (6th from Right)

Mr. Umar Draz

Mr. Umar Draz retired from CEWRE on February 14, 2020, after a service of 42 years. During the service he served as a lecture assistant.

Mr. Sajjad Mehmood

Mr. Sajjad Mehmood retired from CEWRE on February 01, 2020, after a service of 42 years. During the service he served as lab assistant at CEWRE hydro-Geology lab and Model Try hall.



Director CEWRE presenting flowers at farewell of Mr. Umar Draz and Mr. Sajjad Mehmood



Centre of Excellence in Water Resources Engineering

University of Engineering and Technology

Grand Trunk Road, Lahore 54890, Punjab

E-mail: cewre@cewre.edu.pk website: www.cewre.edu.pk