

Muhammad Shahid Iqbal

Hydro Climatic Modeling | Watershed Management |
Nature Based Solutions

+92-321-859-9431

muhammad.shahidiqbal@outlook.com

[linkedin.com/in/muhammad-shahid-ikbal-phd](https://www.linkedin.com/in/muhammad-shahid-ikbal-phd)

Islamabad, Pakistan

PROFESSIONAL SUMMARY

Senior Water Resources and Climate Change Specialist with 18+ years of national & international (Africa, Central Asia, South Asia and NL) experience in climate adaptation, water security, hydroclimatic modelling, and climate-resilient development. Proven expertise in advising governments and international development partners on climate risk assessment, resilient infrastructure, integrated water resources management, and nature-based solutions. Skilled in hydrological modelling, GIS, remote sensing, AI-enabled analytics, and Google Earth Engine to support evidence-based policy and investment decisions. Successfully led multidisciplinary programmes aligned with the Green Climate Fund (GCF), SDGs, and global climate and development frameworks.

EDUCATION

Ph.D.: Hydroclimatic Modeling |
Wageningen University & Research the
Netherlands

MSc (Hons): Agricultural Sciences (Water
Management) | The University of Agriculture
Peshawar, Pakistan

Master of Business Administration (Ex):
Management | Preston University, Peshawar

AREA OF EXPERTISE

Hydrologic Modeling & Simulations	River Basin Modeling	Climate Change Impact Assessment
Nature-based Solution	Extreme Event Analysis (Floods & Droughts)	Climate-resilient River Basin Planning
Climate Modelling Downscaling & Adaptation	Early Warning System and Disaster Risk Reduction	Flood Modeling and Hazard Assessment
Watershed Management	Stakeholder engagement & policy mainstreaming for EbA	Water Productivity Optimization

PROFESSIONAL EXPERIENCE

Lead Trainer Climate Resilient Infrastructure | April 2026- Present

HELVETAS | PAKISTAN

- Leading the design and delivery of Climate-Resilient Infrastructure (CRI) capacity-building programmes for Helvetas Pakistan across D.I. Khan, Charsadda and Swat, serving as Lead Trainer and Technical Resource Person for engineers, planners and technical personnel.
- Developed district-specific training curricula, manuals, presentations and practical learning materials on climate-informed infrastructure planning and design, disaster risk assessment, resilient construction, rehabilitation, O&M and adaptive upgrading, reflecting the distinct flood, flashflood, slope and geotechnical risks of each district. Mainstreamed Nature-based Solutions (NbS), hydrological and flood-risk assessment, GIS/remote sensing and climate-risk considerations into infrastructure planning and design, while strengthening participants' capacity to apply risk-informed and sustainable engineering approaches.
- Provided strategic technical leadership in training delivery, practical exercises, case studies and knowledge assessment, supporting the integration of climate resilience and disaster risk reduction into infrastructure investment and community-level development planning.

Sectoral Recovery Planning Specialist | August 2025- Present

UNDP | PAKISTAN

- Leading the development of sectoral recovery strategies, including inception planning, recovery frameworks, cost interventions, and implementation roadmaps for housing, infrastructure, livelihoods, WASH, and environmental sectors following disaster events.

- Provided strategic technical leadership in stakeholder engagement, evidence-based needs assessments, and validation processes, ensuring recovery priorities were aligned with government policies, institutional capacities, and best international practices.
- Mainstreamed climate resilience, gender inclusion, and results-based monitoring into recovery planning while strengthening multi-agency coordination to support sustainable, risk-informed, and accountable recovery programmes.

Climate Change and Watershed Management Expert | July 2025 – March 2026

HTMA Private Limited | PAKISTAN

- Led hydrological modelling, climate risk assessment, and integrated water resources planning for District Lahore, evaluating future flood, drought, groundwater, and urban water challenges under changing climate conditions to support resilient infrastructure and sustainable water management.
- Applied advanced geospatial technologies, including GIS, remote sensing, Google Earth Engine, and climate downscaling, to assess hydroclimatic risks, water stress, and extreme weather impacts, enabling evidence-based planning and decision-making.
- Designed Nature-based Solutions (NbS) and ecosystem-based adaptation strategies, integrating green-blue infrastructure, floodplain restoration, wetland conservation, and groundwater recharge measures to enhance climate resilience and urban water security.

Water Resource Modeling & NbS Expert | August 2025- May 2026

Blue Green Nexus Private Limited | PAKISTAN

- Led the development of integrated basin-scale hydrological and hydro-agricultural models for the World Bank-funded Sindh Flood Resilience Project, applying AI-enabled analytics, Google Earth Engine, and CMIP6 climate projections to support climate-resilient water resources planning and flood risk management.
- Designed innovative decision-support frameworks integrating hydrological modelling, climate scenario analysis, and machine learning to strengthen irrigation planning, water security, and climate adaptation across vulnerable river basins.
- Developed Nature-based Solutions (NbS) for flood resilience and watershed restoration, providing strategic technical inputs for ecosystem-based adaptation, groundwater recharge, and policy-informed investment planning in collaboration with international partners and multidisciplinary stakeholders. Coordinated with multidisciplinary experts and stakeholders to align technical modeling outputs with implementation needs and field-level realities.

Water Infrastructure and EbA Expert | October 2025- January 2026

Asian Disaster Preparedness Center | PAKISTAN

- Designed and delivered capacity-building programmes on Green Infrastructure (GI), Nature-based Solutions (NbS), and Ecosystem-based Adaptation (EbA) into strengthen climate-resilient water resources management, flood resilience, and adaptation planning across Pakistan.
- Provided strategic technical support to provincial government institutions in integrating GI and NbS into water resources planning, watershed management, and resilient infrastructure through practical guidance, decision-support tools, and institutional capacity development.
- Led the identification of priority investment areas and developed monitoring frameworks for ecosystem-based interventions, promoting flood risk reduction, groundwater recharge, watershed restoration, and long-term water security through cross-sectoral collaboration.

Researcher Water and Climate Modeling | April 2022 – October 2025

International Water Management Institute | PAKISTAN

- Led basin-scale hydrological modelling, climate risk assessments, and integrated water resources planning across Pakistan, including the Kabul, Nari, and Porali River Basins, supporting resilient water management, flood mitigation, Managed Aquifer Recharge (MAR), and sustainable irrigation under changing climate conditions.
- Contributed to transboundary water cooperation under the Blue Peace Central Asia Initiative, supporting river basin planning, integrated water resources management (IWRM), and regional dialogue on shared water resources while advancing basin planning approaches for the Nari and Porali River Basins in Balochistan.
- Led the development of Pakistan's Early Drought Warning System (EDWS) under the FCDO-funded WRAP Programme, strengthening climate resilience, drought preparedness, and water security through climate-informed decision support.
- Designed and delivered executive capacity-building programmes on hydroclimatic modelling, AI-enabled water management, climate adaptation, and resilient infrastructure for government institutions, universities, and development partners, including World Bank-supported initiatives.
- Developed Nature-based Solutions (NbS), Managed Aquifer Recharge (MAR), rainwater harvesting, and green infrastructure interventions to enhance flood resilience, groundwater sustainability, and ecosystem-based adaptation in urban and river basin settings.
- Contributed to climate finance and policy development through preparation of Green Climate Fund (GCF) investment concepts, revision of agroecological zones, and integration of climate-smart water and agriculture strategies into national and provincial planning frameworks.

Water Resource & Climate Change Adaptation Specialist | July 2021 – Feb 2022

Asian Disaster Preparedness Center | ISLAMABAD PAKISTAN

- Led climate risk assessments and the development of district climate adaptation plans for Dera Ghazi Khan and Badin, integrating CMIP6 climate projections, hydrometeorological analysis, and multi-hazard vulnerability assessments to inform climate-resilient water resources management, infrastructure planning, and disaster risk reduction.
- Provided strategic technical leadership in stakeholder engagement, adaptation planning, and results-based monitoring, translating scientific evidence into actionable investment priorities and policy recommendations to strengthen local climate resilience and adaptive capacity.

CONSULTANT CLIMATE CHANGE ADAPTATION | Mar 2021 – Mar 2022

LEVANT Consultant (Pvt.) Limited | LAHORE PAKISTAN

- Led the climate change impact assessment for sustainable water management for Kurram Tangi Dam, integrating CMIP-6 downscaled and bias-corrected climate data (SSP245 & SSP585) to evaluate future water availability and flood risks.
- Applied advanced hydroclimatic modelling, predictive analytics, and AI-driven data processing (Python, R, Google Earth Engine) to assess long-term sustainability and resilience in alignment with ADB's climate adaptation goals.
- Provided climate-informed cost estimations for key infrastructure components, integrating risk-based planning, sustainability frameworks, and nature-based solutions to enhance water resource resilience and economic feasibility.

CONSULTANT HYDROLOGIST | Oct 2021 – Feb 2022

International Water Management Institute | PAKISTAN

- Led technical assessments of groundwater resources, irrigation performance, and farm-level water use efficiency to support sustainable groundwater management and climate-smart irrigation planning in Khyber Pakhtunkhwa.
- Conducted stakeholder engagement and socioeconomic analyses to evaluate the adoption and performance of Solar Irrigation Pumps (SIPs), providing policy recommendations to strengthen

sustainable irrigation, renewable energy integration, and climate-resilient agricultural water management.

HYDRO-METEOROLOGICAL MODELING SPECIALIST (NATCAT PROJECT) | Mar 2020 – Feb 2022

Space and Upper Atmospheric Research Commission (SUPARCO) | PAKISTAN

- Led advanced hydroclimatic modelling and climate risk assessments for the Indus River Basin, integrating CMIP6 climate projections, hydrological modelling, and AI-enabled geospatial analytics to evaluate future flood and drought risks under changing climate scenarios.
- Developed decision-support tools and hazard assessments for flood resilience, water resources planning, and climate adaptation, providing evidence to strengthen resilient infrastructure and disaster risk reduction strategies at national scale.
- Provided strategic technical leadership under the National Catastrophic (NatCat) Programme by strengthening institutional capacity, supporting multidisciplinary teams, and translating complex hydroclimatic analyses into policy-relevant recommendations for government decision-makers.

HYDROLOGIST & GIS SPECIALIST (ADB-Funded Climate Resilient Water Resource Assessment, Balochistan) | May 2020 – Dec 2020

CAMEOS Consultant (Pvt.) Limited | ISLAMABAD PAKISTAN

- Led River Basin Planning and integrated hydrological assessments for major river basins in Balochistan, developing basin-scale water balance models and climate resilience strategies to strengthen water security, sustainable resource management, and long-term adaptation planning across key sectors.
- Applied advanced hydrological modelling, CMIP6 climate projections, GIS, and AI-enabled analytics to assess future water availability and climate risks, providing evidence-based policy recommendations and decision-support tools for integrated water resources management and resilient development.

HYDROLOGIST AND RIVER TRAINING WORK EXPERT | May 2019 – Oct 2020

National Disaster Risk Management Fund (NDRMF) | ISLAMABAD PAKISTAN

- Led hydroclimatic and flood risk assessments across Pakistan, integrating hydrological modelling and climate projections to support climate-resilient water resources management and evidence-based adaptation planning.
- Provided strategic technical review and due diligence for flood protection and water infrastructure investments submitted to the **National Disaster Risk Management Fund (NDRMF)**, ensuring scientific robustness, climate resilience, and alignment with national priorities.
- Advised on hydrological risk analysis, flood hazard modelling, and river training strategies, delivering decision-support for investment prioritization, resilient infrastructure development, and disaster risk reduction.

HYDROCLIMATIC MODELLING SPECIALIST (FEERP ADB Funded Project) | May 2017 – May 2019

Provincial Disaster Management Authority (Punjab) | LAHORE PAKISTAN

- Assisted PDMA Punjab in integrating hydrological risk assessments across the province, supporting data-driven flood resilience planning.
- Acquired and processed hydroclimatic datasets for historical trends and future projections (CMIP-5, RCP 4.5 & RCP 8.5) to assess flood risks under climate change scenarios.
- Assisted the technical team (hydrologists) in scenario selection for future water resource assessments, identifying underlying extreme flood events for proactive risk reduction.
- Contributed to the development of project inception and final reports, aligning assessments with ADB resilience frameworks for effective flood management policies.

HYDROCLIMATIC MODELING SPECIALIST | Mar 2015 – Aug 2017

Qurner Consult (BV) the Netherlands | WAGENINGEN NETHERLANDS

- Led hydrological assessments and basin-scale water balance analyses for **Ghana and Benin**, evaluating crop water requirements, agricultural water availability, and climate impacts to support sustainable irrigation planning and climate-resilient agricultural development.
- Applied advanced hydrological modelling, remote sensing, climate data downscaling, and bias correction techniques to improve water resource assessments, strengthen evidence-based decision-making, and address critical data gaps for integrated water resources management.
- Contributed to the development of technical recommendations and investment-oriented planning frameworks through multidisciplinary collaboration, delivering policy-relevant analyses to enhance water security, agricultural productivity, and climate resilience across West Africa

RESEARCHER | Sep 2012 – Aug 2017

Wageningen University and Research the Netherlands

- Led advanced hydroclimatic modelling and climate impact assessments for the **transboundary Kabul River Basin**, evaluating future water availability, floods, and droughts to support integrated water resources management, climate adaptation, and evidence-based transboundary water cooperation.
- Applied AI-enabled analytics, hydrological modelling, GIS, remote sensing, and Google Earth Engine to develop innovative solutions for flood risk assessment, sustainable irrigation, Managed Aquifer Recharge (MAR), rainwater harvesting, and climate-resilient water management.
- Produced internationally recognized research through peer-reviewed publications and conference presentations, advancing scientific knowledge on hydroclimatic modelling, transboundary water governance, and climate resilience during doctoral research.

HYDROLOGIST AND ENVIRONMENTAL SPECIALIST | Feb 2006 – Mar 2012

CAMEOS Consultant (Pvt.) Limited | ISLAMABAD PAKISTAN

- Contributed to the planning and feasibility assessment of major water infrastructure projects in Pakistan, including multi-purpose dams and water resources development schemes, through hydrological investigations, technical feasibility studies, and project planning documentation (PC-I).
- Supported the preparation of environmental assessments (IEE), water resources evaluations, and inception studies to inform sustainable infrastructure development, water security, and climate-resilient investment planning across Khyber Pakhtunkhwa and Balochistan.

PUBLICATIONS

Some of my most recent publications are listed below, and details are available on the Research Gate (<https://www.researchgate.net/profile/Muhammad-Iqbal-553/research>)

- Ahmad, N. Lu, H. Yu, Z. Adeyeri, O. E. **Iqbal, M. S.** and Su, J. (2024) A distributed modeling approach to water balance implications from changing land cover dynamics in permafrost environments. *Geography and Sustainability*. <https://doi.org/10.1016/j.geosus.2024.06.004>
- Bhatti, M. T. Gillani, H. Ashraf, M. **Iqbal, M. S.** Munir, S. (2024) Field Validation of NDVI to Identify crop phenology signatures. *Precision Agriculture*. <https://doi.org/10.1007/s11119-024-10165-6>.

- Bilal, H. **Iqbal, M.S.** Li, X. Tulcan, R. X. S. and Chhetri, M. T. (2024) Unveiling the Dynamics of Cryptosporidium in Urban Surface Water: A Quantative Microbial Risk Assessment and Insights into Climatic and Seasonal Influences. *Water* 2024, 16, 1352.
- Haleema Attaullah, Asif Khan, Mujahid Khan, Hadia Atta, **Muhammad Shahid Iqbal** (2023) Implications of Accuracy of Global Glacier Inventories in Hydrological Modeling: A Case Study of the Western Himalayan Mountain Range. *Journal Of Water* 15(22). DOI: 10.3390/w15223887
- Hazrat Bilal, Xiaowen Li, **Muhammad Shahid Iqbal**, Asad Ghufuran (2023) Surface water quality, public health, and ecological risks in Bangladesh—a systematic review and meta-analysis over the last two decades. *Environmental Science and Pollution Research* (2023) 30(40):1-19
- Attaullah, H. Khan, A. Khan, M. Khan, F. Ali, S. Masud, T. **Iqbal, M.S.** (2022) The Karakoram Anomaly: Validation through Remote Sensing Data, Prospects and Implications. *Water* 2022, 14, 3157..
- **Iqbal, MS**, Shah, M. et al 2022. Spatiotemporal analysis of drought and rainfall in Pakistan via Standardized Precipitation Index: homogeneous regions, trend, wavelet, and influence of El Niño-southern oscillation. July 2022. *Theoretical and Applied Climatology*