Prof. Dr. MUHAMMAD SHOAIB
Professor Department of Agricultural Engineering, Bahauddin Zakariya University, Multan-Pakistan
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SUMMARY

Results driven professional possessing expertise in Machine Learning applications in Water Resources Engineering.

Total Experience **22 Years**

Teaching/Research **20 Years**

Professional/Research **2 Years**

EDUCATION

2016 **PhD Civil Engineering**, University of Auckland, New Zealand
(Thesis Title: "Impact of Wavelet Transformation on Data Driven Rainfall-Runoff Models")

2006 One Year Diploma in **Integrated Water Resources Management**, United Nations University International Network on Water, Environment and Health at Asian Institute of Technology, **Bangkok, Thailand**

2002 **M.Sc. Water Resources Management,** Centre of Excellence in Water Resources Engineering, University of Engineering and Technology(UET), Lahore, Pakistan
(Thesis Title: "Modeling Overland flow and runoff from flat gravity irrigated fields having dikes"

1999 **B.Sc. Agricultural Engineering**, University of Agriculture, Faisalabad, Pakistan

WORK HISTORY

Department of Agricultural Engineering, BZU, Multan, Pakistan **25-07-2022 to date**
(Professor)

Department of Agricultural Engineering, BZU, Multan, Pakistan **01-01-2020 to 24-07-2022**
(Associate Professor)

Department of Agricultural Engineering, BZU, Multan, Pakistan **06-11-2004 to 31-12-2019**
(Assistant Professor)

National Engineering Services of Pakistan (NESPAK), Lahore, Pakistan **30-01-2004 to 05-11-2004**
(Senior Engineering (Hydrology/Hydraulic/Sedimentation Modeler)

International Water Management Institute (IWMI), Lahore, Pakistan **01-07-2002 to 29-01-2004**
(Water Resources Engineer/Research Officer)

Associated Consulting Engineers-(ACE), Lahore, Pakistan **09-04-2002 to 30-06-2002**
(Trainee Junior Engineer)

Centre of Excellence in Water Resources Engineering, UET, Lahore, Pakistan **01-01-2001 31-03-2002**
(Research Associate)

PROFESSIONAL EXPERIENCE

A) Department of Agricultural Engineering, BZU, Multan, Pakistan:

- Coordinator for PEC visit to the Department
- Convener, SAR Committee
- Member, Curriculum and Learning Process Committee
- Taught different subjects of Water Resources Engineering which includes **Surveying**, **Computational Hydraulics** & **Fluid Mechanics, Open Channel Hydraulics,** Surface **Water Hydrology**, **Irrigation Engineering**, **Soil and Water Conservation Engineering**, etc, to the students to undergraduate and Graduate Engineering disciplines.

- Conducted research related to Water Resources through various research projects funded by BZU and HEC
- One of the core member of the team prepared PC-1 for the establishment of Agricultural Engineering Department at BZU
- Procured Lab equipment worth Rs. 90 Million for various laboratories of Agricultural Engineering
- Performed various administrative assignments including Secretary Admission Committee, Secretary Exam Committee, Secretary technical purchase committee etc.

B) The University of Auckland, New Zealand

- Worked as Teaching Assistant for the subjects of
  i. Water Resources Modelling (CIVIL 731)- a course offered to post-graduate Civil Engineering students.
  ii. Hydrology (ENVENG 333)- a course offered to undergraduate Civil Engineering students Introduction to Engineering Drawing (ENGGEN 115)- a course offered to undergraduate Civil Engineering students.
  iii. Managing Design and Communication (ENGGEN 204)- a course offered to undergraduate Civil Engineering students.
  iv. Advanced Mechanics & Mathematical Modeling (ENGGEN 150FC))- a course offered to undergraduate Engineering students
  v. Mathematical Modelling I (ENGSCI 111)- a course offered to undergraduate Engineering students Mathematical Modelling II (ENGSCI 211)- a course offered to undergraduate Engineering students
  vi. Thinking Applied to Managing a Business (ENGGEN 403). a course offered to undergraduate Engineering students

C) National Engineering Services of Pakistan (NESPAK), Lahore, Pakistan

Worked on the following assignments under Flood Protection Sector Project 2 (Package –C)

- Developed Hydrodynamic models for Indus river system and its tributaries
- Developed Hydrological Models for the tributaries of the Indus river system and its tributaries
- Developed spreadsheet models for discharge computation at different barrages for river Jhelum and river Chenab.
- Reviewed and modified the discharge computation procedure adopted by the Irrigation department.

D) **International Water Management Institute (IWMI), Lahore, Pakistan**

During the stay in IWMI, worked in two projects

1. Operation Support for Pehur High Level Canal (PHLC)

- **Development of Hydraulic/Sedimentation model** for the Upper Swat Pehur Hight level Canal (USC-PHLC) in order to evaluate the hydraulic performance of the USC-PHLC system using SIC (Simulation of Irrigation Canals) model. SIC is a hydrodynamic hydraulic model developed by CEMAGREF, France.
- **Development of Optimization Model for the USC-System**
  An Optimization model based on dynamic programming technique was developed for the USC-PHLC System in Microsoft Visual Basic to study optimal water allocation of the NWFP's quota under the provincial water accord. This is intended to study the trade-offs between hydro electricity generation through Tarbella Dam and alternative use of water for Agriculture in Swabi District, NWFP.

2. Development of Decision Support System (DSS) for River Basin Management
Involved in the development of spatial database and spatial modeling in GIS, for the IIMI's Benchmark basin Rechna Doab for the project of "Development of Decision Support System for river basin management"

E) Associated Consulting Engineers-(ACE), Lahore, Pakistan
Review of Hydrological Studies of different Dams in Pakistan.

F) Centre of Excellence in Water Resources Engineering, UET, Lahore, Pakistan
Developed fully hydrodynamic overland flow and runoff model for the flat irrigated areas. Two-dimensional St. Venant Equation was used to develop the model and Kostikove's infiltration equation was used to model the infiltration. MacCormack's Explicit finite difference scheme was used to solve the 2D St. Venant Equation. The model code was written in Java Computer language.

PROFESSIONAL COURSES

2022 **Five days** training course on "Research Capacity Building Program for Principal Investigators" organized jointly by British Council and Higher Education Commission Pakistan

2003 **Two-weeks** training course on "***Canal Simulation Modeling using the SIC v. 4.0 software***" held by International Water Management Institute (IWMI), at **Colombo, Sri Lanka**

Two-weeks training course on **"*ArcView GIS and Avenue Porogramming*"** held by International Water Management Institute (IWMI), at **Colombo, Sri Lanka**

2002 **Six-days** training course on "**Crop Based Irrigation Operation Model (CBIO)"** held by International Water Management Institute (IWMI), at **Swabi, Pakistan**

PUBLICATIONS (Total Publications : 42, ISI Indexed: 40)

A. Journal Articles

1. Aziz, K., Rahman, A., & **Shoaib, M.** (2013). Co-Active Neuro Fuzzy Inference System for Regional Flood Estimation in Australia. *Journal of Hydrology and Environment Research*, *1*(1), 11-20
2. **Shoaib, M.,** Shamseldin, A. Y., & Melville, B. W. (2014). Comparative study of different wavelet based neural network models for rainfall-runoff modeling. *Journal of Hydrology*, *515*, 47-58. https://doi.org/10.1016/j.jhydrol.2014.04.055 **Impact Factor:6.3**
3. Khan, M. M., Shamseldin, A. Y., Melville, B. W., & **Shoaib, M.** (2014). Impact of Ensemble Size on TIGGE Precipitation Forecasts: An End-User Perspective. *Journal of Hydrologic Engineering*, *20*(2), 04014046. https://doi.org/10.1061/(ASCE)HE.1943-5584.0001025 **Impact Factor: 1.90**
4. Khan, M. M., Shamseldin, A. Y., Melville, B. W., & **Shoaib, M.** (2014). Stratification of NWP Forecasts for Medium-Range Ensemble Streamflow Forecasting. *Journal of Hydrologic Engineering*, *20*(7), 04014076. doi:10.1061/(ASCE)HE.1943-5584.0001075 **Impact Factor: 1.90**
5. **Shoaib, M.,** Shamseldin, A. Y., Melville, B. W., & Khan, M. M. (2015). Runoff forecasting using hybrid Wavelet Gene Expression Programming (WGEP) approach. *Journal of Hydrology*, 527, 326-344. doi:10.1016/j.jhydrol.2015.04.072 **Impact Factor:6.3**
6. **Shoaib, M.,** Shamseldin, A. Y., Melville, B. W., & Khan, M. M. (2014). Hybrid Wavelet Neuro-Fuzzy Approach for Rainfall-Runoff Modeling. *Journal of Computing in Civil Engineering*, *30*(1), 04014125-1-16. doi:10.1061/(ASCE)CP.1943-5487.0000457 **Impact Factor:5.20**
7. **Shoaib, M.,** Shamseldin, A. Y., Melville, B. W., & Khan, M. M. (2016). A comparison between wavelet based static and dynamic neural network approaches for runoff prediction. *Journal of Hydrology*, *535*, 211-225. doi:10.1016/j.jhydrol.2016.01.076 **Impact Factor: 5.722**
8. Aziz, K., Haque, M., Rahman, A., Shamseldin, A., & **Shoaib, M.** (2016). Flood estimation in ungauged catchments: application of artificial intelligence based methods for Eastern Australia. *Stochastic Environmental Research and Risk Assessment*, 1-16 DOI:10.1007/s00477-016-1272-0 **Impact Factor:3.60**
9. Khan, S., Melville, B.W., Khan, M.M., **Shoaib, M.** & Shamseldin, A.Y. (2017). Effect of baffles on the hydraulic performance of sediment retention ponds. *Water Science & Technology,* 75(9) 1991-1996 **DOI:** 10.2166/wst.2016.475 **Impact Factor: 2.6**
10. **Shoaib, M.** Shamseldin, A.Y., Khan, S., Khan, M.M., Khan, Zahid M. & Melville, B.W. (2016). A wavelet based approach for combining the outputs of different rainfall-runoff models. *Stochastic Environmental Research and Risk Assessment.32, 155-158.* doi:10.1007/s00477-016-1364-x **Impact Factor: 3.60**
11. Aslam, M., Zahid M. K, Sultan,M., Niaz, Y., Mahmood, H., **Shoaib, M.**, Shakoor, A., & Ahmad, M. Performance Evaluation of Trickling Filter based Wastewater Treatment System utilizing Cotton Sticks as Filter Media. *Polish Journal of Environmental Studies.26 (5),* 1955–1962. **Impact Factor: 1.30**
12. **Shoaib, M.**, Shamseldin, Asaad Y., Khan, Sher, Khan, Mudasser Muneer, Khan, Zahid Mahmood, Sultan, Tahir, Melville, Bruce, W. (2018). "A Comparative Study of Various Hybrid Wavelet Feedforward Neural Network Models for Runoff Forecasting." *Water Resources Management*.32, 83-103. 1-21 DOI: 10.1007/s11269-017-1796-1 **Impact Factor: 4.7**
13. Qureshi, M.W., Zahid, M.K., Ahmad, Fiaz, **Shoaib, M.,** Farid, H.U., Khan, A.A., Sial, J.K., (2018). "Design and Performance Evaluation of an Indigenously Developed Small-Scale Fish-Oil Extraction Unit; a Solution for Improving Fish Farm Environments". *Polish Journal of Environmental Studies. 27(6):* 2711-2718. DOI: *10.15244/pjoes/81111* **Impact Factor: 1.30**
14. **Shoaib, M.,** Shamseldin, A.Y., Khan, S., Sultan, M., Ahmad, F., Sultan, T., Dahri,Z.H., Ali, I. (2019) "Input Selection of Wavelet-Coupled Neural Network Models for Rainfall-Runoff Modeling" *Water Resources Management*. 33(3): 955-973.DOI 10.1007/s11269-018-2151-x **Impact Factor: 4.70**
15. Bhatti, E.H., Khan, M.M., Shah, S.A.R., Raza, S.S., **Shoaib, M.,** Adnan, M. (2019) "Dynamics of Water Quality: Impact Assessment Process for Water Resources Management" *Processes* 7(2), 102, https://doi.org/10.3390/pr7020102 **Impact Factor: 2.80**
16. Qureshi, M.W.G., Khan, Z.M., Hussain, M., Ahmed, F., **Shoaib, M.,** Qasim, M. (2019). "Experimental Evaluation of a Diesel Engine for Combustion, Performance and Exhaust Emissions with Fuel Blends Derived from a Mixture of Fish Waste Oil and Waste Cooking Oil Biodiesel" *Polish Journal of Environmental Studies. 28(4):* 2793–2803. DOI: 10.15244/pjoes/90096 **Impact Factor: 1.30**

17. Faiz, M.A., Liu, D., Fu, Q., Baig, F., Tahir, A.A., Khan, M.I, **Shoaib, M.**, Li, T., Cui, S. (2019). "Multi-index drought characteristics in Songhua River basin, Northeast China" *Climate Research* 78 (1):1-19. **Impact Factor: 1.60**
18. Khan, T.A., Farooq, K., Muhammad, M., Khan, M.M., Shah, S.A.R., **Shoaib, M.,** Aslam, M.A., Raza, S.S. (2019). The Effect of Fines on Hydraulic Conductivity of Lawrencepur, Chenab and Ravi Sand. *Processes*, *7(11)*, 796. https://doi.org/10.3390/pr7110796 **Impact Factor: 2.847**
19. Khan,S., **Shoaib, M.,** Khan, M.M., Melville, B.W., Shamseldin, A.Y. (2019). Hydraulic investigation of the impact of retrofitting floating treatment wetlands in retention ponds. *Water Science & Technology*. 80 (8): 1476–1484. doi: https://doi.org/10.2166/wst.2019.397. **Impact Factor: 1.915**
20. Shaukat, R., Khan, M.M., Shahid, M., **Shoaib, M.,** Khan, T.A., Aslam, M.A., (2020). "Quantitative Contribution of Climate Change and Land use Change to Runoff in Tarbella Catchment, Pakistan" *Polish Journal of Environmental Studies*.29 (5), 3295–3304, DOI: 10.15244/pjoes/112214 **Impact Factor: 1.699**
21. Raza, A., **Shoaib, M.**, Khan, A., Baig, F., Faiz, M.A., Khan, M.M. (2020) "Application of non-conventional Soft computing approaches for estimation of reference evapotranspiration in various climatic regions" Theoretical and Applied Climatology***139,*** *1459–1477 (2020). https://doi.org/10.1007/s00704-019-03007-3* **Impact Factor: 2.70**
22. Raza, A., Shoaib, M., Faiz, M.A., Baig, F., Khan, M.M., Ullah, M.K., Zubair, M. (2020). "Comparative Assessment of Reference Evapotranspiration Estimation Using Conventional Method and Machine Learning Algorithms in Four Climatic Regions" *Pure and Applied Geophysics* https://doi.org/10.1007/s00024-020-02473-5 : **Impact Factor: 1.90**
23. Ahmad F, Qiu B J, Ding Q S, Ding W M, Khan Z M, Shoaib M, Chandio, FA, Rahim, A., Khaliq A. (2020). "Discrete element method simulation of disc type furrow openers in paddy soil" *International Journal of Agricultural and Biological Engineering* 13(4):103-110 ***Impact Factor: 2.032***
24. Ahmad, F., Adeel, M., Qui, B., Ma, J., **Shoaib, M.,** Shakoor, A., Chandio, F. A. (2021). "Sowing Uniformity of Bed-Type Pneumatic Maize Planter at Various Bed Preparation Levels and Machine Travel Speed". *International Journal of Agricultural and Biological Engineering" 14(1): 165–171* **Impact Factor: 2.032**
25. Hussain, S., Khan, M.M., **Shoaib, M,** Raza, A., Shah, S.A.R., Khan, T.A., Khan, S. (2021). "Performance evaluation of participatory irrigation management as an alternative to a state-managed irrigation system" *Irrigation and Drainage*. 69(3): 150-168. DOI: 10.1002/ird.2515. **Impact Factor: 1.879**
26. Dahri, ZH, Ludwig, F, Moors, E, Ahmad, S, Ahmad, B, **Shoaib, M,** Ali, I, Iqbal, MS, Pomee, MS, Mangrio, AG, Ahmad, MM, Kabat, P. (2021). Spatio-temporal evaluation of gridded precipitation products for the high-altitude Indus basin. *International Journal of Climatology* 2021;41(8):4283–4306.. https://doi.org/10.1 **Impact Factor: 4.069**
27. Hammad, M., **Shoaib, M.**, Salahudin, H., Baig, M.A.I., Khan, M.M., Ullah, M.K. (2021). Rainfall forecasting in upper Indus basin using various artificial intelligence techniques. *Stochastic Environmental Research and Risk Assessment*.**35,** 2213–2235 https://doi.org/10.1007/s00477-021-02013-0 **Impact Factor: 3.379**
28. Raza, Ali, **Shoaib, M.,** Baig, M.A.I., Shakil, A., Khan, M.M., Ullah, M.K., Hashim, S. (2021). "Comparative Study of Powerful Predictive Modeling Techniques For Modeling Monthly Reference Evapotranspiration In Various Climatic Regions" Fresenius Environmental Bulletin 30 (06B/2021):7490-7513. **Impact Factor: 0.489**
29. Waqas M., **Shoaib, M.,** Saifullah, M., Naseem, A., Hashim, S., Ehsan, F., Ali, I., Khan, A. (2021) "Assessment of Advanced Artificial Intelligence Techniques for Streamflow Forecasting in Jhelum River Basin" *Pakistan Journal of Agricultural Research*. 34(3):580-598. **Impact Factor: 0.748**
30. **Shoaib, M.,** Salahudin, H., Hammad, M., Ahmad, S., Khan, A., Khan, M., Baig, M.A.I., Ahmad, F., Ullah, M.K. (2021). *"Performance Evaluation of Soft Computing Approaches for Forecasting COVID-19 Pandemic Cases."* SN Computer Science.2:372. https://doi.org/10.1007/s42979-021-00764-9
31. Raza, A., Hu, Y., **Shoaib, M.,** Abd Elnabi, M.K., Zubair, M., Nauman, M., Syed, N.R. (2021). "*A Systematic Review on Estimation of Reference Evapotranspiration under Prisma Guidelines" Polish Journal of Environmental Studies* 30 (6): 1-10. DOI: 10.15244/pjoes/136348. **Impact Factor: 1.699**
32. Khan, M.T.,**Shoaib, M.**, Hammad, M.,Salahudin, H., Ahmad, F., Ahmad, S. (2021). "Application of Machine Learning Techniques in Rainfall–Runoff Modelling of the Soan River Basin, Pakistan." *Water* **2021**, *13*(24), 3528; **https://doi.org/10.3390/w13243528** **Impact Factor: 3.530**
33. Syed, Z., Ahmad, S., Dahri, Z.H., Azmat, M., **Shoaib, M.,** Izhar, I., Qamar, M.U., Hussain, S.Z., Ahmad, S., (2022). "Hydroclimatology of the Chitral River in the Indus Basin under Changing Climate." *Atmosphere* **2022**, *13*(2), 294; **https://doi.org/10.3390/atmos13020294** **Impact Factor: 2.686**
34. Noor, R, Inam, A., Zahra, S.M., **Shoaib, M.**, Riaz, R., Sarwar, A., Asif, M., Ahamd, S. (2022). "A methodological framework for modeling sustainability visions: A case study of groundwater management in Faizpur distributary, Pakistan" *"Agricultural Water Management*. 271 (2022). https://doi.org/10.1016/j.agwat.2022.107822.

Impact Factor: 6.611

35. Humphries, U.W., Ali. R., Waqas, M., **Shoaib, M.,** Vamakovida, P., Faheem, M., Having, P.T., Lin, H.A., Ahmad, S., (2022). "Runoff Estimation Using Advanced Soft Computing Techniques: A Case Study of Mangla Watershed Pakistan" *Water.* 14(20), 3286, https://doi.org/10.3390/w14203286 **Impact Factor: 3.530**
36. Asif, M., Inam, A., Adamowski, J., **Shoaib, M.,** Tariq, H., Ahmad, S., Alizadeh, M.R., Nazeer, A. (2023). "Development of methods for the simplification of complex group built casual loop diagram: A case study of Rechna Doab" *Ecological Modeling 476(2023) 110192.* https://doi.org/10.1016/j.ecolmodel.2022.110192**Impact Factor: 3.512**
37. Khan, M.T.,**Shoaib, M.**, Raffaele, A., Inam, Salahudin, H., Hammad, M., Ahmad, S., Ali, M.U., Hashim, S., Ullah, M.K. (2023). "*Intercomparison and Assessment of Stand-Alone and Wavelet-Coupled Machine Learning Models for Simulating Rainfall-Runoff Process in Four Basins of Pothohar Region, Pakistan*." *Atmosphere* **2023**, *14*(3), 452; https://doi.org/10.3390/atmos14030452 (registering DOI) **Impact Factor: 3.110**
38. Waqas, M., Hashim, S., Humphiries, U.W., Ahmad, S., Noor, R., **Shoaib, M.,** Naseem, A., Hlaing, T.P., Lin, A.H. (2023). "Composting Processes for Agricultural Waste Management: A Comprehensive Review" *Processes* **2023**, *11*(3), 731; **https://doi.org/10.3390/pr11030731** **Impact Factor: 3.352**
39. Salahudin, H., **Shoaib, M.,** Raffaele, A., Baig, M.A.I, .Hammad, M., Raza, A., Akhtar, A., Ali, M.U. (2023). "**Using Ensembles of Machine Learning Techniques to Predict Reference Evapotranspiration (ET_0) Using Limited Meteorological Data"** *Hydrology* **2023**, *10*(8), 169; https://doi.org/10.3390/hydrology10080169 **Impact Factor: 3.20**
40. Naeem, M.; Farid, H.U.; Madni, M.A.; Albano, R.; Inam, M.A.; **Shoaib, M**.; Shoaib, M.; Rashid, T.; Dilshad, A.; Ahmad (2024) A. GIS-Based Analytical Hierarchy Process for Identifying Groundwater Potential Zones in Punjab, Pakistan. *ISPRS Int. J. Geo-Inf.* 2024, *13*, 317. https://doi.org/10.3390/ijgi13090317 **Impact Factor: 2.80**
41. Waqas, M., Naseem, A., Humphries, U. W., Hlaing, P. T., **Shoaib, M.,** & Hashim, S. (2024). A Comprehensive Review of the Impacts of Climate Change on Agriculture in Thailand. *Farming System*, 3(1) https://doi.org/10.1016/j.farsys.2024.100114 **Impact Factor 8.4**
42. Abbas, T., **Shoaib, M.,** Albano, R., Baig, M. A. I., Ali, I., Farid, H. U., & Ali, M. U. (2025). Artificial-Intelligence-Based Investigation on Land Use and Land Cover (LULC) Changes in Response to Population Growth in South Punjab, Pakistan. *Land*, *14*(1), 154. https://doi.org/10.3390/land14010154. **Impact Factor: 3.20**
43. Waleed, M.; Inam, M.A.; Albano, R.; Samad, A.; Farid, H.U.; **Shoaib, M.**; Ali, M.U. (2025) Statistical Model Development for Estimating Soil Hydraulic Conductivity Through On-Site Investigations. *Hydrology* ***12*(3), 55; https://doi.org/10.3390/hydrology12030055** **Impact Factor: 3.10**
44. Kanwar, R.M.A, Khan, Z.M., **Shoaib, M.,** Farid, H.U., Sultan, M., Shakoor, M., Ahmad, F., Ullah, A., Shahzad, M.W., Javid, S.F, Ameen, A. (2025). Performance evaluation of novel cascade aerating trickling flter: contaminants removal and biodegradation model. *International Journal of Environmental Science and Technology.* https://doi.org/10.1007/s13762-025-06438-w **Impact Factor: 3. 0**
45. Ali, A., Farid, H.U., **Shoaib, M.,** Anjum, M.N. (2025). Sensitivity of groundwater quality to climate explained variability in the areas of Indus Basin of Pakistan. *Water and Environment Journal*. **https://doi.org/10.1111/wej.12985** **Impact Factor: 1.7**
46. Zakariya, K. M., Sarwar, T., Farid, H. U., Albano, R., Inam, M. A., **Shoaib, M.,** Ahmad, A., & Ahmad, M. (2025). Land Use Land Cover (LULC) Mapping for Assessment of Urbanization Impacts on Cropping Patterns and Water Availability in Multan, Pakistan. *Earth*, *6*(3), 79. https://doi.org/10.3390/earth6030079 **Impact Factor: 3.4**
47. Saleem, M.A, Shoaib, M., Hashim, S., Shoaib, M., Farid, H.U., Ghaffar, M.A., Ismail, M., Ameen, A., Lee, J., Inam, M.A., Jun, C. (2025). Machine learning-based streamflow projections in the upper indus basin under CMIP6 climate scenarios, Physics and Chemistry of the Earth, Parts A/B/C, 140. https://doi.org/10.1016/j.pce.2025.104035. **Impact Factor: 4.1**
48. Saleem, M.A., **Shoaib, M.,** Hashim, S., Shoaib, M., Farid, H.U., Ismail, M., Ghaffar, M.A, Mujataba, A., Lee, J., Inam, M.A, Ameen, A. *(2025)* Projecting future climate extremes in the glacier-fed upper Indus basin using machine learning based downscaling of CMIP6 GCMs. *Theoretical and Applied Climatology* **156**, 567 https://doi.org/10.1007/s00704-025-05793-5 **Impact Factor: 2.7**
49. Kanwar, R. M. A., T. Ahmad, Z. M. Khan, **Shoaib, M.,** Liu, D., Sultan, M., Shahzad, M.W., Ali, I. 2026. " Leveraging Supervised Machine Learning Algorithms in Predicting Contaminants Removal From Novel Cascade Aerating Trickling Filter." *Water and Environment Journal* 1–15. **https://doi.org/10.1111/wej.70096**. **Impact Factor: 1.9**

B. Conference Papers

1. Hammad, M., **Shoaib, M.,** Salahudin, H., Inam, M.A. (2024). "**Flood Risk Assessment Using Gumbel's Method and River Flow Prediction at Taunsa Barrage, Indus River"** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.

2. Kanwar, R.M.A., Khan, ZM, **Shoaib, M.,** Farid, HU., Shakoor, A. (2024).“**Evaluation of Wastewater in Pakistan: Characterization and Impact Assessment”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
3. Kanwar, R.M.A., Khan, ZM, **Shoaib, M.,** Farid, HU., Shakoor, A. (2024). “**Enhanced Nitrogen removal from the municipal wastewater using a hybrid trickling filter”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
4. Zubair,HS, **Shoaib, M.,** (2024). “**A Comparison of Machine Learning and Deep Learning Models for Runoff Forecasting in Mangla Reservoir”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
5. Hannan, H., **Shoaib, M.**, Naqvi, SQA, Bashir, A., Ashraf, H., Qamar, S., Asif, M. (2024). **“Comparative Analysis of Soft Computing Approaches for Rainfall–Runoff Modeling: A Case of Tarbela Dam”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
6. Jamil, M., Ghani, MU, **Shoaib, M.,** Raza, S. (2024). **“Design and Performance Evaluation of Mango Pruner”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
7. Qamar, S., Ashraf, H., Sultan, M., Shoaib, M. Hannan, A. (2024). “Exploring Decadal Spatiotemporal Trends in **Reference Evapotranspiration and Dominant Climatic Factors in Punjab, Pakistan using Geospatial Analysis”** A paper presented at National Conference on Climate Change and Water Resources (CCWR) Bridging the Gap for SDG6, CCWR-2024, 28-29 February 2024, Department of Agricultural Engineering, Bahauddin Zakariya University, Multan.
8. Hammad, M., **Shoaib, M.,** Salahudin, H., Inam, M.A. (2023). “**Enhanced Univariate River Flow Forecasting for Data-Deficient Locations - An Exploratory Application of Machine Learning and Deep Learning Models”** A paper presented at 3rd Flagship International Conference on Water, Energy, and Environment for Sustainability (IC-WEES 2023) At: National University of Science & Technology (NUST), Islamabad, Pakistan. 16-18th August 2023.
9. **Shoaib, M. (2023). “Use of Artificial Intelligence in Agricultural Engineering”** A paper presented at International Conference on Precision and Sustainable Agriculture Under Climate Change. February 16-17 2023. Khwaja Fareed University of Engineering and Information Technology, Rahim Yar Khan, Pakistan.
10. Maqsood, A., **Shoaib, M.**, Salaudin, H.. (2021). Evaluation of Various Soft Computing Approaches to Estimate Reference Evapotranspiration of three Cities of South Punjab. In: International Conference on Hydrology and Water Resources 2021. Centre of Excellence in Water Resources Engineering: UET Lahore-Pakistan, pp. 33-40. ISBN: 978-969-8670-06-01
11. Waqas, M, Saifullah, M., Hashim, S., **Shoaib, M.,** Naseem, A.,Khan, M. (2021). Modelling of Rainfall-runoff process by GEP, RBF-SVM and M5 model tree in Jhelum River Basin, Pakistan. n: International Conference on Hydrology and Water Resources 2021. Centre of Excellence in Water Resources Engineering: UET Lahore-Pakistan, pp. 105-112. ISBN: 978-969-8670-06-01
12. Baig, F., Faiz, M.A., **Shoaib, M.,** Aziz, R. (2019). Precipitation Inconsistency and Uncertainty Assessment of Stream Discharges in Rivers of Pakistan. 6th International Conference on “Sustainable Agriculture in Changing Climate: Strategies and Management” June 19-21, 2019. The University of Poonch, Rawalakot, Azad Jammu and Kashmir-Pakistan
13. Baig, F., Faiz, M.A., Khan, Z.M., **Shoaib, M.,** (2019). Evaluation of Gridded Precipitation Data sets and its Impact on Sustainable Water Resources in Pakistan. 6th International Conference on “Sustainable Agriculture in Changing Climate: Strategies and Management” June 19-21, 2019. The University of Poonch, Rawalakot, Azad Jammu and Kashmir-Pakistan
14. Baig, Faisal, Faiz, M.A., Khan, Z.M., **Shoaib, M**. (2018) “Utilization of Markov Chain Monte Carlo Approach for calibration and uncertainty analysis of environmental models” IEEE 2018 International Conference on Computing, Mathematics and Engineering Technologies-iCoMET 2018, March 3-4, 2018, Sukkur IBA University
15. Fiaz, A., Khan, Z.M., **Shoaib, M.,** Weimin, D., Khawaja, A.N. (2018). “DEM Simulation of Bed-Shaper and Furrow Openers of Pneumatic Planter” XIX. World Congress of CGIR) (Commission Internationale du Genie Rural) held on April, 22-25 in Antalya, Turkey.
16. **Shoaib, M., (2018).** A lecture delivered on “Application of Soft Computing Approaches in Water Resources Engineering” Continuing Professional Development Program of Pakistan Engineering Council 0.5 credit point. A seminar held on 19.04.2018 at the Department of Agricultural Engineering, B.Z.U. Multan

17. Niaz, H., Sultan, M., Miyazaki, T., Mahmood, M.H., Khan, ZM, **Shoaib, M.** (2018). Evaluation of Desiccant based Air-Conditioning System for Livestock's Thermal Comfort. 5th International Conference on Energy, Environment and Sustainable Development (EESD-2018) At: Mehran University of Engineering and Technology (MUET), Jamshoro, Pakistan
18. Ahmad, F., Weimin, D., Qishou, D., **Shoaib, M.** (2016) 3-D "Discrete Element Modeling For Soil Tool Interaction, A Noval Approach for Cohesive Soil"A paper presented at 1st National Conference on Agricultural Engineering & Sciences held on 30-31 May, 2016 at Department of Agricultural Engineering, BZU, Multan.
19. Qureshi, M.W.G., Khan, Z.M., Ahmad, F., **Shoaib, M.,** Sial, J.K. (2016). Design and Performance Evaluation of Indigenous Small Scale Fish Oil Extraction Unit. A paper presented at 1st National Conference on Agricultural Engineering & Sciences, held on 30-31 May, 2016 at Department of Agricultural Engineering, BZU, Multan
20. Aziz, K., Rahman, A., Shamseldin, A., & Shoaib, M. (2013). Regional flood estimation in Australia: Application of gene expression programming and artificial neural network techniques. In J. Piantadosi, R. S. Anderssen, & J. Boland (Eds.), *20TH INTERNATIONAL CONGRESS ON MODELLING AND SIMULATION (MODSIM2013)* (pp. 2283-2289). Adelaide, AUSTRALIA: MODELLING & SIMULATION SOC AUSTRALIA & NEW ZEALAND INC. Retrieved fromhttp://gateway.webofknowledge.com/
21. Zahid, M., **Shoaib, M.** (2009) Nitrate-nitrogen management for groundwater quality a paper published in the Proceeding of 1st International Conference on " Role of Energy Resources in sustainability of Environment" 26-28 February, 2009.
22. **Shoaib, M.,** Tariq, A.R. (2005). Development of Two-Dimensional Overland flow model for flat gravity irrigated fields, A paper presented in International Conference on "Modeling Tools for Environment and Resources Management-MTERM" to be held from 6-10 June, 2005 at Asian Institute of Technology Bangkok, Thailand.

C. Book Chapter

1. **Shoaib, M.,** Shamseldin., Melville., & Khan. (2016). Hybrid wavelet neural network approach, *Artificial Neural Network Modelling, Studies in Computational Intelligence* (Vol. 628, pp. 127-143). Switzerland: Springer International Publishing. doi:10.1007/978-3-319-28495-8_7
2. Hammad, M., **Shoaib, M.**, Salahudin, H., Baig, M. A. I., & Ali, M. U. (2023). Use of AI for Disaster Risk Reduction in Agriculture. In *Disaster Risk Reduction in Agriculture* (pp. 461-488). Singapore: Springer Nature Singapore.
3. Atique-ur-Rehman, Qamar, R., Garcia y Garcia, A., **Shoaib, M.,** Ahmad, S. (2025). Irrigation Management in Vegetable Crops. In: Iqbal, Z., Anjum, M.A., Ercisli, S., Rauf, S. (eds) Sustainable and Innovative Vegetable Production in times of Climate Change. Springer, Singapore. https://doi.org/10.1007/978-981-96-6283-8_14
4. Farid, H.U, Zubair, N., **Shoaib, M.,** Inam, M.A., Khan, Z.M., Kanwar, R.M.A, Anjum, M. N., Mubeen, M., Shakoor, A. and Shahzad, K. (2025). Modern Irrigation Methods. In: Mubeen, M., Jatoi, W.N., Hashmi, M.Z., Ahmad, M. (eds) Innovations in Agricultural Water Management. Springer, Cham. https://doi.org/10.1007/978-3-031-91883-4_3
5. Kanwar, R.M.A., Khan, Z.M., **Shoaib, M.** (2025). Wastewater Treatment Systems for Peri-Urban Agriculture. In: Shaaban, M. (eds) Soils and Sustainable Agriculture. Frontier Studies in Soil Science. Springer, Cham. https://doi.org/10.1007/978-3-031-91114-9_33

D. Thesis/Dissertation

1. ***Impact of Wavelet Transformation on the Data Driven Rainfall-Runoff Models.*** A thesis submitted in partial fulfilment for the requirement of the degree of Doctor of Philosophy in Civil Engineering at University of Auckland, New Zealand in 2016
2. ***Modeling overland flow and run off for flat gravity irrigated diked fields.*** A thesis submitted in partial fulfilment for the requirement of the degree of Masters of Science in Water Resources Management at Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore in 2002

THESIS SUPERVISED

A) PhD Agricultural Engineering

1. Tariq, Muhammad (2023). "Runoff Estimation Using Artificial Intelligence-Based Method in Pothwar Region." A thesis submitted in partial fulfillment of the requirements for the degree of PhD Agricultural Engineering.

B) MSc (Hons) Agricultural Engineering

1. Waqas, Muhammad (2018). "Forecasting of Monthly Streamflow by using Artificial Intelligence Techniques" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
2. Ali, Rana Rashid. (2018) "Runoff Estimation Using Soft Computing Approaches" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
3. Hayat, Umar (2019) "Modeling pan evaporation process using various machine learning techniques" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
4. Raza , Ali (2019) "Estimation of reference evapotranspiration using conventional and non-conventional soft computing approaches" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
5. Khan, Shahrukh (2019) "Comparative Evaluation of Evapotranspiration Estimation Using Physically Based Models and Soft Computing Approaches" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
6. Hammad, M. (2021). "Rainfall Forecasting in Upper Indus Basin Using Various Artificial Intelligence Approaches" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
7. Salahudin, H. (2021). "Estimation of Reference Evapotranspiration Using Hybrid Soft Computing Approaches" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
8. Shahid, H. (2021). "Performance Evaluation of Cotton Stalk Puller Shredder in Terms of Soil Health" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
9. Farooq, O. (2021). "Runoff Estimation Using HEC-GeoHMS- A case Study in the Upper Indus Basin" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
10. Hannan, A. (2022). "Use of Soft Computing Approaches for Runoff Estimation; A case study of Tarbella Dam, Pakistan." A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
11. Maqsood, A., (2023). "Using Nonparametric and Deep Learning Algorithms to Analyze Seasonal Rainfall Data: A case study of Pakistan." A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
12. Bukhari, Hafiz Syed Zubair (2023). "A comparison of Machine Learning and Deep Learning Models for Runoff Estimation in Mangla Reservoir" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
13. Ahmad, Farooq (2024). "Predicting Ground water level using various AI Techniques for Aquifer Management" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
14. Abbas, Tanweer (2024). Artificial Intelligence-Based Investigation of Land Use Land Cover (LULC) Dynamics in South Punjab, Pakistan" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
15. Jameel, Ramzan (2025). "Performance Evaluation of Responsive Drip and Nano-Porous Pipe Compared to Conventional Drip for Irrigating Garlic in Islamabad" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.
16. Huzaifa, Muhammad (2025). "Assessing Climate change Impact on Water Productivity of Wheat Crop in South Punjab Pakistan using Aqua Crop" A thesis submitted in partial fulfillment of the requirements for the degree of MSc (Hons) Agricultural Engineering.

RESEARCH GRANTS

	Date of Award	*Title*	*Sponsoring Agency/ Organization*	*Amount (Rs.)*
1.	28-11-2016	Implementation of Hybrid Wavelet Neural Network Approach for Runoff Prediction	BZU	200,000/
2.	11.10.2017	Modeling Rainfall-Runoff process using Wavelet based generalized feed forward neural network models	BZU	200,000/
3.	02.06.2018	Use of Soft Computing Techniques to Estimate Evapotranspiration in Southern Punjab	HEC	38,631,13/