CURRICULUM VITAE

Name of Firm	:	National Engineering Services Pakistan (Pvt.) Limited
Name of Person	:	**MUHAMMAD FRAZ ISMAIL**
Nationality	:	Pakistani
Date & Place of Birth	:	March 26, 1990 / Punjab - Pakistan
Profession	:	Water Resources Engineering
Position in Firm	:	Senior Engineer (Water Resources)
Specialization in Firm	:	Snow and glacier melt runoff modelling, Flow forecasting, Trans-boundary waters matters, Research and analysis
Year of joining firm	:	2011
Registration Number with Pakistan Engineering Council	:	Civil/30244
Affiliation with Professional Institutions	:	i. Member Pakistan Engineering Council ii. Member Pakistan Engineering Congress iii. International Association for Hydro-Environment Engineering and Research (IAHR), Germany
Email.	:	fraz.ismail@tum.de

KEY QUALIFICATIONS

As a team member worked on developing the snow and glacier melt runoff models for the Upper Indus, Upper Jhelum, Upper Chenab and Kabul River Basins (i.e. Rim stations). Provided technical assistance in carrying out flow forecasting studies for various snow and glacier fed catchments. Assisted in assessing the climate change impacts on these catchments in Pakistan as well as evaluated the future water availability under climatic change for these catchments. For the hydrological modelling, mainly used gridded and station based observational data sets related to glacier, snow, temperature and precipitation. Developed various scripts using R programming language and VBA Excel programming for data download and analysis.

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EDUCATION

Name of Institution	Year	Degree
Technical University of Munich Germany	2016 (on going)	Ph.D. Water Resources
University of Engineering & Technology, Lahore	2015	M.Sc. Hydraulics & Irrigation Engineering
University of Engineering & & Technology, Taxila, Pakistan	2010	B.Sc. Civil Engineering

EXPERIENCE

Project: **Trend of Degree-Day Factors in response to the hydro-climatic and physiographic parameters**

Institute: Technical University of Munich, Germany.
Koblenz University of Applied Sciences, Germany.

Year: November 2016 – to-date

Position: Ph.D. Candidate / Engineering Research Assistant

Activities:

- Installation and operation of a snow and meteorological parameters measurement station.
- Performed Hydro-meteorological data analysis as well as hydrological modelling
- Assisted in the preparation of research proposals and publications
- Conducted lectures on Geographic Information system using ArcGIS and QGIS software's

Publications:

- Ismail, M.F., Naz, B.S., Wortmann, M. et al. Comparison of two model calibration approaches and their influence on future projections under climate change in the Upper Indus Basin. Climatic Change (2020). https://doi.org/10.1007/s10584-020-02902-3.
- Ismail, M. F. and Bogacki, W.: Scenario approach for the seasonal forecast of Kharif flows from the Upper Indus Basin, Hydrol. Earth Syst. Sci., 22, 1391–1409, 2018. , https://doi.org/10.5194/hess-22-1391-2018
- Ismail, M. F., Rehman, H., Bogacki, W., and Noor, M.: Degree Day Factor Models for Forecasting the Snowmelt Runoff for Naran Watershed, Sci. Int. Lahore, 27, 1961–1969, 2015.

Project: **Hydrological Modelling for Flow Forecasting Study of Kabul River Basin Using GIS/RS Technology**

Client: Water and Power Development Authority (WAPDA), Ministry of Water Resources, Government of Pakistan

Year: 2018 – 2020

Position: Senior Engineer
Activities:

- Downloaded satellite based remote sensed data (MODIS-snow, GLIMS-glaciers, NOAA RFE – Rainfall estimates) data for the Kabul River Basin
- Preparation of complete database as well as data processing using different R-scripts for the hydrological model input data
- Development of Snow and glacier melt Runoff Model (SRM+G) for the Kabul River Basin
- Diagnostic Calibration of the SRM+G model
- Preparation of Hind-cast and forecast results for the Kabul River Basin
- Technical report writing for the hydrological modelling task

Project: **Development of Water Resources Management Information System (WRMIS) and Decision Support System (DSS) for Efficient Irrigation Water Management in Punjab**
Client: Punjab Irrigation Department, Government of Punjab, Pakistan
Year: 2015 – 2018
Position: Senior Engineer
Activities:

- Downloaded satellite based remote sensed data (MODIS-snow, GLIMS-glaciers, NOAA RFE – Rainfall estimates) data for the Chenab River Basin
- Preparation of complete database as well as data processing using different R-scripts for the hydrological model input data
- Development of Snow and glacier melt Runoff Model (SRM+G) for the Chenab River Basin
- Diagnostic Calibration of the SRM+G model
- Analysis of monthly temperature lapse rate for different elevation zones for the Chenab River Basin
- Preparation of Hind-cast and forecast results for the Chenab River Basin
- Integration of SRM+G model in the Decision Support System (DSS)
- Technical report writing for the hydrological modelling task

Project: **National Flood Protection Plan Phase IV (NFPP-IV)**
Client: Federal Flood Commission, Government of Pakistan
Year: 2013 – 2014
Position: Senior Engineer
Activities:

- Coordination between the Client and the Consultant for data procurement
- Preparation of GIS-based maps for the Chenab River Basin including basin characteristics, existing gauging network in the Chenab River Basin, hydro-electric power plants in Indian part of Chenab River Basin, historic monsoon patterns, historic flood peaks, design discharge

capacity of different barrages on the Chenab River, Area wise flood problem, Integrated river basin management

- Analysis and comparison of Satellite based precipitation (NOAA & TRMM) and snow cover area (MODIS) with the ground observations for the Swat catchment
- Involved in the flood-forecasting model selection for the Kabul and Swat river basins
- Data preparation and calibration/validation of wflow_HBV model
- Testing of wflow_HBV model for Kabul and Swat River basins using the observed data
- Testing of Flood Early Warning System (FEWS) using the dummy data and eradication of different errors
- Technical report writing

Project:	**Climate change Adaptation and Impact Assessment for Mohmand Dam, Pakistan under joint venture of AHT, NESPAK and HYDROC consultant**
Client:	European Union
Year:	2012 – 2013
Position:	Junior Engineer
Activities:	

- Data collection and review of related studies on the Swat River Basin
- Calibration and validation of the Snowmelt runoff model (SRM) for the Swat River basin.
- Assessment of elevation zone wise contribution of snowmelt runoff and its impact on the proposed dam water storage in different seasons.
- GIS based mapping of the Swat river basin, map for the command area of Mohmand dam, irrigation network and related settlements in catchment.
- Assisted in climate change adaptation and impact assessment study for Mohmand Dam
- Technical report writing

Project:	**Upgrading of Tools, Water Resource Data Base, Management System and Models under Sub-Component B1 of WCAP under a joint venture of AHT, DELTARES, GAMS and NESPAK.**
Client:	Water and Power Development Authority (WAPDA), Ministry of Water Resources, Government of Pakistan
Year:	2011 – 2012
Position:	Junior Engineer
Activities:	

- Hydrological as well as the satellite data download and review of all available snow melt runoff models
- Extraction and analysis of satellite data for snow cover area and precipitation from MODIS and NOAA RFE data sources, respectively
- Selection and application of Snow Melt Runoff Model for the Mangla Basin

- Carried out a case study of Neelum River Basin using the Snowmelt Runoff Model (SRM) in order to observe the impact of individual sub-basins within the Mangla Basin
- Developed a comprehensive procedure for the 10-Daily and Seasonal (Kharif and Rabi) flow forecasting for the Mangla Basin
- Climate change impact assessment of various climatic scenarios for the Mangla Basin and estimated the future water availability

LANGUAGE CAPABILITY

English: Excellent in speaking, reading and writing
Urdu: Excellent in speaking, reading and writing
German: Fair in speaking, reading and writing