

CURRICULUM VITAE (CV)

Name	Dr. Pawan Kumar Bhattarai
Area of Expertise	Water Resources Engineering (Civil Engineering)
Date of Birth	June 24, 1979
Nationality	Nepali

Education:

Institution	Dates Completed	Degree/diploma obtained
Disaster Prevention Research Institute, Kyoto University, Japan	2015	Ph.D. in Civil Engineering (Hydraulics)
Norwegian University of Science and Technology (NTNU)	2008	M.Sc. in Hydraulics (Hydropower Development)
Institute of Engineering (IOE), Pulchowk Campus, Tribhuvan University (TU)	2002	Bachelor's degree in civil engineering

Key Qualifications:

Dr. Bhattarai holds Ph.D. in Civil Engineering (Hydraulics) from Kyoto University, Japan and M.Sc. in Hydraulics (Hydropower Development) from Norwegian University of Science and Technology (NTNU). During his 15 years of University experience, Dr. Bhattarai has diverse Experience Working on **different types of hydrological and hydraulic modeling like HEC-HMS, HEC-GeoHMS, HEC-GeoRAS, HEC-RAS: 1D & 2D, HEC-SSP, HEC-FDA, HEC ResSim, SWMM, Tank, Thron, Win SRM, SWAT, Dam break, GIS, Surfer etc.** He is Significantly contributed to the field of climate change and hydrology through publication of books, articles and technical reports related to Climate Change, Water Balance study, Surface water modeling, ground water modeling, Drought Modeling, Floods hazard modeling and analysis in different regions of Nepal.

Other Trainings:

- Flood Management System -2008 October for 7 days- UNU, Tokyo, Japan,
- Hydropower Development and Management: ICH, 6-25 June 2009, Trondheim, Norway,
- Advanced AutoCAD and Auto LISP Training – 2000,
- Geographical Information Systems (Spatial data processing with GIS and use of GIS for climate change analysis)- 27 Sep 2008 – 1 Oct 2008- United Nations University, Tokyo,
- Geographical Information System (GIS) – 2003, Kathmandu, Nepal,
- Bio-Engineering Techniques for slope and stream stabilization for Technical Professionals -2004,
- Farmer managed Irrigation System, 2005

Employment Records:

Period	Employing organization and your title/position. Contact information for references	Country	Summary of activities performed
May 2009 to till now	Employer: Pulchowk Campus, Tribhuvan University Position: Lecturer	Nepal	Teaching Water Resources Subjects, working in various positions within IOE and Pulchowk campus
July 2022 to March 2024	Employer: Ministry of Forest and Soil Conservation/GEF/UNDP/IOE project Position: Dy. Team Leader/Flood VHR Assessment Expert (intermittent need basis input) For References: Prof. Dr. Vishnu Pandey, Team Leader Vishnu.pandey@gmail.com 9841318939	Nepal	Flood Hazard modelling (Flood hazard vulnerability and risk assessment)
July 2023 to December 2023	Madi Consultancy P. Ltd. Position Held: Hydrologist For Reference: Mr. Yubaraj Gharti Magar, CEO	Nepal	Detailed Project Report of Surainaka Reservoir and Recreational Zone at Kapilvastu.

	Madiconsultancy75@gmail.com 9851118603		
January 2020 to June 2022	Employer: Ministry of Energy, Water Resources and irrigation; Position: Dy. Team leader/ Hydraulic modelling (intermittent input) For Reference: Prof. Dr. Vishnu Pandey, Team leader Vishnu.pandey@gmail.com ; 9841318939	Nepal	Hydraulic modelling and take a lead for streamlining contents or report from hydropower and sedimentation prospective; review and provide feedback in the entire report.
February 2017 to August 2017	Employer: DSCWM Position Held: SWAT Modeler;	Nepal	Conceptual model preparation of surface and groundwater link.
July 2010 to December 2010;	Employer: ITECO Nepal (P) Ltd Position Held: Hydrologist	Nepal	Hydrological investigation (collection, analysis and interpretation of maps and precipitation and river flow data) of 180 river crossings in Khidkijyula-Manma section and 525 river crossings in Manma-Jumla section of Karnali Highway.
January 2009 to July 2009	Employer: SILT Consultants Pvt. Ltd. Position Held: Hydrologist (Deputy Team Leader) (6 Months) For Reference: Mr. Keshav Kunwar, MD Tel.: 01-4425788 Email: info@silt.com.np	Nepal	Emergency Flood Damage Rehabilitation Project (Sunsari, Kailali and Kanchanpur Districts - Terai Region) DoR/ADB.
January 2009 to December 2019	Employer: ERM C P. Ltd. Position Held: Hydrologist; For Reference: Mr. Uddab Raj Chaulagain, MD ermc@ermcnepal.com	Nepal	<ul style="list-style-type: none"> • Determination of Flood Warning and Danger Level of Seti River in Flood Forecasting Stations. • Determination of Flood Warning and Danger Level of Seti River in Flood Forecasting Stations. • Design Review, Update of Cost Estimate and Construction Supervision of Koshi Bridge-270 m (Chatara), Emergency Flood Damage Rehabilitation Project. (ADB Grant No 0150-NEP (SF). • Discharge Measurement at all Gauging stations of FFP, Flood Hazard mapping and impact Evaluation. • Determination of Flood Danger Level in Flood Forecasting Stations in Koshi and Kankai River. • Determination of flood danger level in flood forecasting stations in karmali river at chisapani and rapti river at rajaiya. • Detailed Engineering Design of Budhi Ganga Khola Small Hydropower Project (10.85 MW), Bajura District in Nepal under Department of Electricity Development (DoED). • Naumure Multipurpose Project (250 MW and Irrigation 80,350 ha). • Management and Implementation Consultants – Building Climate Resilience of Watersheds in Mountain Eco-Regions financed by ADB. • Construction Supervision, Quality control and

			Contract Management of Civil Works in Main Canal Ch 15+00 to Ch 35+000 km of Sikta Irrigation Project . <ul style="list-style-type: none"> • Bagmati Irrigation Project (26000 ha) funded by Saudi Fund. • PhD (from January 13 to September 2015).
September 2006 to November 2008	Department of Hydraulics and Environment Engineering, Norwegian University of Science and Technology (NTNU)	Nepal	MSc in Hydraulic (Hydropower)
January 2005 to December 2005	Employer: Everest Engineering Consultancy Pvt. Ltd. Position: Civil Engineer (Hydraulic); For Reference: K.D. Yadav, Executive Director 9851037567	Nepal	<ul style="list-style-type: none"> • Tangram Khola 17kW • Taman Khola 20kW • Thekuwa Khola 24kW • Kalun Khola 21kW • Diuli Khola 22kW • Baidi Khola 43kW
January 2002 to August 2004	Employer: EPSOM Consultancy Pvt. Ltd. Position Held: Civil Engineer; For Reference: Er. Khimanand Kandel, Executive director; 9851070202	Nepal	<ul style="list-style-type: none"> • (Lower Parajul HPP (between 1MW to 5MW), • Lohore HPP (between 1MW to 5MW) • Tame Hydro Project (4MW)

Membership In Professional Associations and Publications:

- International Association of Hydro-Environmental Research (IAHR)
- Japanese Society of Civil Engineers (JSCE)
- American Geophysical Union (AGU)
- Nepal Engineering Council (NEC)
- Nepal Engineer's Association (NEA)
- Japanese University Alumni association of Nepal, (JUAAN)

Languages:

Languages	Proficient Level		
	Speaking	Writing	Listening
English	Excellent	Excellent	Excellent
Nepali		Mother Tongue	
Hindi	Good	Good	Good
Japanese	Good	Good	Good

Details experience regarding Water Resources Engineering (Civil Engineering)

1. Pulchowk Campus, TU	<ul style="list-style-type: none"> • Deputy Head, Department of Civil Engineering • Coordinator, MSc Transportation Engineering • Warden, Pulchowk Campus Hostel • Member, Civil Engineering Subject Committee (Current) • Coordinator, MSc Water Resources Engineering (Current)
2. Various Universities (Pokhara University, Farwestern University, Mid western University, Manmohan Technical University etc.)	<ul style="list-style-type: none"> • Syllabus Preparation Committee member • Subject Committee member
3. Institute of Engineering, Centre for Water Resources Studies Name of Assignment or Project: Multi Hazard Vulnerability and Risk Assessment (MHVR) in Lower Dudhkoshi Watershed;	

Year: July 2022 to June 2024 (intermittent input-till date);
Employer: Ministry of Forest and Soil Conservation/ GEF/UNDP
Location: Nepal;
Main Project Features: Multi Hazard Vulnerability and Risk Assessment (MHVR) in Lower Dudhkoshi Watershed
Position Held: Dy. Team Leader/Flood VHR Assessment Expert;
Activities Performed: Responsible for Flood Hazard modelling (Flood hazard vulnerability and risk assessment), Close coordination with the team leader and team member for desk study, Field survey and report preparation.

4. Pulchowk Campus Assignment

Name of Assignment or Project: Impact Assessment of Kulekhani 1,2. & 3 HEPs (on Water Resources Management, Watershed Management Associated with Socioeconomic & Livelihood);
Year: January 2020 to June 2022 ;
Employer: Ministry of Energy, Water Resources and Irrigation;
Location: Nepal;
Main Project Features: Impact Assessment of Kulekhani 1,2. & 3 HEPs on Water Resources Management, Watershed Management Associated with Socioeconomic and Livelihoods.
Position Held: Dy. Team Leader/ Hydraulic modelling;
Activities Performed: Responsible for take a lead for streamlining contents or report from hydropower and sedimentation prospective; review and provide feedback in the entire report.

5. Name of Assignment or Project: Naumure Multipurpose Project (250 MW and Irrigation 80,350 ha);

Year: June 2018 to December 2019;
Location: Banke District, Terai Region of Nepal; **Client:** DoED;
Main Project Features: Naumure Multipurpose Project is expected to water 80,350 ha hectares of land in Kapilvastu along with large land plots in Bangeshala of Pyuthan and 250 MW of electricity.; **Project Cost:** NRs. 91,922.937 million;
Position held: Hydrologist;
Activities performed: Responible for: i) Hydrological, Sedimentological and Meteorological (Radar Type Telemetry) survey and data collection- installation of automatic hydrological gauging station near the dam site, installation of evaporimeter, monthly discharge measurement and analysis (30 months), collection and analysis of sedimentological and mineralogical / petrologic data, sediment sampling and laboratory analysis (340 samples), PSD Analysis (24 PSD), 5 Mineralogical sample (24 nos.), Silt Lab establishment at site tec), Responsible for Installation of Automatic Hydrological Station with Telemetry, GLOF Studies, Climate change Studies etc, Delineation of catchment area, transportation and regional monthly flow, development of Flow Duration Curve (FDC) and annual hydrograph and estimation, mean annual flow and low flow (drought) analysis, maximum flood flow analysis, maximum and minimum estimation of design floods and development of rating curves and determining HFL and hydraulic modeling, **Run SWAT and SWAT+ model and compare the output to finalize the Hydropower potentiality Power**, impacts of future hydro-climatic changes; **Detailed hydraulic optimization design and cost estimate** of major structures of project like Dam including reservoir, intake, spillway, gates, penstock and powerhouse and tailrace. Activities under Team Leader and Close coordination with Deputy Team Leader/senior Hydrologist.

6. Name of Assignment or Project: 111 MW Rasuwagadhi Hydroelectric Project under Rasuwagadhi Company Limited (RCL), Rasuwa District;

Year: August 2017 to June 2018 (Input: 11 month);
Location: Rasuwa District, Nepal;
Client: Rasuwagadhi Hydropower Company Ltd.;
Major Project Features: The project utilizes a gross head of 167.90 m by diverting the Bhotekoshi River Flow through 4.203 km long tunnel to an underground powerhouse. The design discharge of the project is 80 cumec and installed capacity is 111 MW. The outlet tunnel of these three individual de-sanding basins of an average length of 125 m each will finally be merged into a single point to connect the headrace tunnel of this option. **Headrace Tunnel (Length 4203.0m) Size of Shotcretes Section 6.4m (w) x 6.4m (h): Horseshoe-shaped, Size of Concrete Lined 6.0m Dia.: Circular Section; Total Project Cost:** US\$ 5.94 million;
Position Held: Hydrologist;
Activities Performed: Responsible for detailed engineering and River hydrology survey, sedimentation, Installation of Automatic Hydrological Station with Telemetry, GLOF Studies, Climate change Studies etc., Delineation of catchment area, transportation and regional monthly flow, development of Flow Duration Curve (FDC) and annual hydrograph and estimation, mean annual flow and low flow (drought) analysis, maximum flood flow analysis, maximum and minimum estimation of design floods, development of rating curves and determining HFL and hydraulic modeling, **Run SWAT and SWAT+ model and compare the output to finalize the Hydropower potentiality analysis, the specific location of hydropower sub-components and impacts of future hydro-climatic changes; detailed**

hydraulic optimization design and cost estimate of Headworks: headrace tunnel and canal, surge tank / forebay etc.

7. Name of Assignment or Project: Hydrological and Hydro-geological investigation of Sardu and Seuti Watershed;

Year: February 2017 to August 2017;

Location: Dharan Municipality, Nepal;

Client: Department of Soil Conservation and Watershed Management, Ministry of Forest and Soil Conservation;

Main Project Features: Conceptual model preparation of surface and groundwater link;

Position held: SWAT Modeler;

Activities Performed: Responsible for collecting the data for **Stimulate and run Soil and Water Assessment Tool (SWAT) for watershed modelling** and divided watershed into smaller sub-watersheds and hydrologic response units (HRUs) with their unique attributes; and identify surface water-groundwater interaction.; assist Senior Hydrologist cum Team Leader for report Preparation.

8. Name of Assignment or Project: Detailed Engineering Design of Budhi Ganga Khola Small Hydropower Project (10.85 MW), Bajura District in Nepal under Department of Electricity Development (DoED);

Year: January 2016 to December 2017;

Location: Bajura District;

Main Project Features: Review for **Hydrological Analysis and Modeling, Sediment Analysis, Seismicity Study, Run SWAT Model for Hydropower potentiality study & impacts of future hydro-climatic changes** and data interpretation, Geotechnical Analysis and Recommendation, Project Layout and Detail Engineering Design, Construction planning, **Climate Change Study, Land Inventory and Property Acquisition Survey.**

Position Held: Hydrologist cum Hydraulic Expert;

Activities performed: **Responsible for i) Hydrological and meteorological survey and data collection** - installation of hydrological gauging station with telemetry system using GSM & CDMA technology, monthly discharge measurement (24 Months) and analysis and collection of sediment data (24 samples), Water quality samples & analysis (16 samples), **ii) Responsible Hydrological analysis and Modeling:** Installation of Automatic Hydrological Station with Telemetry, GLOF Studies, Climate change Studies etc., Delineation of catchment area, transportation and regional monthly flow, development of Flow Duration Curve (FDC) and annual hydrograph and estimation, mean annual flow and low flow (drought) analysis, maximum flood flow analysis, maximum and minimum estimation of design floods, development of rating curves and determining HFL and hydraulic modeling, **Run SWAT and SWAT+ model and compare the output to finalize the Hydropower potentiality analysis, the specific location of hydropower sub-components and impacts of future hydro-climatic changes;** **iii) hydraulic design and cost estimation:** of headrace tunnel and canal, surge tank / forebay; penstock pipe including bends, Y and corresponding saddle, supports and anchor blocks; hydraulic design of powerhouse building and tailrace tunnel canal; flood protection measures; design of hydro-mechanical components including turbines, governor, press oil supply system, pressure air supply system, overhead travelling crane, draft tube, gates, openings, ligmings, bell-mouth, bends, expansion joints, Y-furcates etc.

9. Name of Assignment or Project: Bagmati Irrigation Project (26000 ha) funded by Saudi Fund;

Year: January 2012 to December 2012 (Input: 12 months);

Location: District Saralahi, Nepal; **Client:** Ministry of Irrigation, Government of Nepal;

Main Project Features: Construction Supervision, Command Area Development and Operation & Maintenance Work, **River Training works (Command Area Protection Works) along Bagmati, Lalbakaiya, Chandi & Lakhandehi River – 15.72 km, Total Project Cost (approx.): USD 20 million;**

Position Held: Construction Supervision Expert/ Hydrologist;

Activities Performed: Responsible for design, construction supervision and quality control of works of river training works including: (i) Ensure that the works are being implemented as per the contract specifications; (ii) **Conduction of necessary hydrological studies, river morphology and analysis of hydro-meteorological data** for the successful rehabilitation of River Training works ; (iii) Assist Team Leader in the preparation of quarterly and annual progress reports; (iv) Assist in supervising construction works with regard to layout/setting out and design and in examining the quality control measures with full responsibility; (v) Suggest appropriate solutions to the project management in time on problems encountered during construction; (vi) Overall responsibility to assist smooth execution of the project works in a smooth manner for the timely and successful completion of the project; (vii) Check the layout of the structures and its components; (viii) Construction quality control and quality assurance of works, laboratory testing and checking. (ix) Involved in hydrological analysis data review, design review and re-design of irrigation structure and Construction supervision of river training works including riverbank and bed protection structures, canal and bridges

protection structures, construction quality control and quality control river training works and contract management and contractor's claim management of works, Contract management and execution of project as per FIDIC documents.

10. Name of Assignment or Project: Discharge Measurement at all Gauging stations of FFP, Flood Hazard mapping and impact Evaluation;

Year: January 2011 to November 2011;

Location: Major River Basin of Nepal;

Client: DHM, Babarmahal;

Main Project Features: Discharge Measurement, high flood value calculation, fluvial flood analysis, High Flood Impact Evaluation, Determine Flood Danger Level and Mark it at Flood Forecasting Station flood control/protection measure near the station area;

Position Held: Hydrologist;

Activities Performed: Responsible for Discharge Measurement, high flood value calculation, pluvial and fluvial flood analysis, High Flood Impact Evaluation, Determine Flood Danger Level and Mark it at Flood Forecasting Station flood control/protection measure near the station area, set up and run hydrodynamic model (e.g., HEC-RAS, GeoSFM and SWAT) for the area and generate different scenarios of (fluvial) flooding and its future impact. Run the model for embankment breach analysis and other obstructions for flood forecasting. **Prepare a GIS-based hazard map for the area for different water level at station).** Validate the map using field information. Find out danger level (threshold water level) above which there would be significant flooding and damage to life and properties. Mark that warning level and danger level at the forecasting station with different color by erecting flood pillar. Prepare reports including all above mentioned things.

11. Name of Assignment or Project: Hydrological analysis of river crossings;

Year: July 2010 to December 2010;

Location: Jumla, Karnali Districts, Nepal;

Client: Road Sector Development Project, Dept. of Roads, Ministry of Physical Planning and Works;

Main Project Features: Hydrological investigation (collection, analysis and interpretation of maps and precipitation and river flow data);

Positions Held: Hydrologist;

Activities Performed: Hydrological investigation (collection, analysis and interpretation of maps and precipitation and river flow data) of 180 river crossings in Khidkijyula-Manma section and 525 river crossings in Manma-Jumla section of Karnali Highway.

12. Name of Assignment or Project: Determination of Flood Danger Level in Flood Forecasting Stations in of Koshi and Kankai River;

Year: January 2010 to June 2010;

Location: Koshi and Kankai Basin, Eastern Region;

Client: DHM, Babarmahal;

Main Project Features: Flooding is a major natural disaster in Nepal causing loss of life and property. It is seen that the number of lives lost due to extreme events is decreasing but at the same time the number of families affected, agricultural areas impacted, and monetary damages is steadily increasing. Flood forecasting and warning is an effective non-structural method of flood management. With this background, the objective of this study is to determine **Flood Danger Level** and its future impact on climate, mark it at **Flood Forecasting Station** of mainly two rivers: **Koshi River at Chatara** and Kankai River at Mainachuli. The Kosi River (also called Saptakoshi) is a trans-boundary river between Nepal and India, one of the largest tributaries of the Ganges. The entire Koshi River basin has a catchment area of 69,300 km² upto its confluence with the Ganges in India, out of which, 29,400 km² lies in China, 30,700 km² in Nepal and 9,200 km² in India. The Koshi basin occupies western part of Nepal. In a direct line, the basin is about 160 kilometres from north to south and covers six geological and climatic belts. Within the Koshi catchment lie eight peaks over 8,000 metres high, including Mount Everest, 36 glaciers, and 296 glacial lakes. Studies show that 16 of these glacial lakes pose a threat of a glacial lake outburst flood. For the Koshi basin, the study reach is fixed from Chatara-Kothu gauging site, located at 26° 52' 00" N and 87° 09' 30" E and elevation of 140 m, to the Indo-Nepal border.

Position Held: Hydrologist;

Activities Performed: Responsible for the

- Prepare DEM for the area from SRTM data and other point elevation data available at the Department of Survey
- Take cross-section survey at upstream boundary (Forecasting station), downstream boundary (Nepal-India border) and at least two more sections in between where necessary (i.e. the land is very flat). Take cross section survey upto 15 m above the highest flood level. Take longitudinal survey along river stretches of 100 to 500 m either upstream or downstream to find out riverbed (water surface) slope.
- Compute Manning's and establish stage-discharge relationships from measured discharges and cross-section

survey.

- **Set up and run hydrodynamic and hydrological model (e.g., HEC-RAS, GeoSFM, SWAT etc.) for the area and generate different scenarios of (fluvial) flooding.**
- **Run the model for embankment breach analysis** and other obstruction for flood forecasting.
- **Prepare a GIS-based hazard map for the area for different water level at upstream boundary (forecasting station).**
- Validate the map using field information.
- Find out danger level (threshold water level) above which there would be significant flooding and damage to life and properties.

Mark that warning level and danger level at the forecasting station with different colour by erecting flood pillar. Prepare the reports accommodating all the findings and results.

13. Name of Assignment or Project: Determination of flood danger level in flood forecasting stations in karmali river at chisapani and rapti river at rajaiya;

Year: August 2009 to December 2009;

Location: Karnali and Rapti River Basin;

Client: DHM Babarmahal;

Main Project Features: Flood modelling;

Position Held: Hydrologist;

Activities Performed:

- Prepare DEM for the area from SRTM data and other point elevation data available at the Department of Survey
- Take cross-section survey at upstream boundary (Forecasting station), downstream boundary and at least two more sections in between where necessary (i.e. the land is vary flat). Take cross section survey up to 15 m above the highest flood level. Take longitudinal survey along river stretches of 100 to 500 m either upstream or downstream to find out riverbed (water surface) slope.
- Compute Manning's and establish stage-discharge relationships from measured discharges and cross-section survey.
- **Set up and run hydrodynamic and hydrological model (e.g. HEC-RAS, GeoSFM and SWAT) for the area and generate different scenarios of (fluvial) flooding.**
- Run the model for embankment breach analysis and other obstruction for flood forecasting.
- **Prepare a GIS-based hazard map for the area for different water level at upstream boundary (forecasting station).**
- Validate the map using field information.
- Find out danger level (threshold water level) above which there would be significant flooding and damage to life and properties
- Mark that warning level and danger level at the forecasting station with different colour by erecting flood pillar.
- Prepare the reports accommodating all the findings and results.

Activities Under Team Leader.

14. Name of Assignment or Project: Determination of Flood Danger Level in Flood Forecasting Stations in Narayani & West Rapti Basin;

Year: January 2009 to July 2009;

Location: Narayani & West Rapti River Basin, Western Region;

Client: DHM, Babarmahal

Main Project Features: Flood Modeling;

Position Held: Hydrologist;

Activities Performed: Responsible for

- Prepare DEM for the area from SRTM data and other point elevation data available at the Department of Survey
- Take cross-section survey at upstream boundary (Forecasting station), downstream boundary and at least two more sections in between where necessary (i.e. the land is vary flat). Take cross section survey up to 15 m above the highest flood level. Take longitudinal survey along river stretches of 100 to 500 m either upstream or downstream to find out riverbed (water surface) slope.
- Compute Manning's and establish stage-discharge relationships from measured discharges and cross-section survey.
- **Set up and run hydrodynamic and hydrological model (e.g. HEC-RAS, GeoSFM, and SWAT) for the area and generate different scenarios of (fluvial) flooding.**
- Run the model for embankment breach analysis and other obstruction for flood forecasting.
- **Prepare a GIS-based hazard map for the area for different water level at upstream boundary (forecasting station).**

- Validate the map using field information.
- Find out danger level (threshold water level) above which there would be significant flooding and damage to life and properties.
- Mark that warning level and danger level at the forecasting station with different colour by erecting flood pillar.
- Prepare reports including all above mentioned things.
- Prepare the reports accommodating all the findings and results.

Activities Under Team Leader.

15. Name of Assignment or Project: Tangram Jhola 17 kW, Taman Khola 20 kW, Thekuwa Khola 24 kW, Kalun Khola 21 kW, Diuli Khola 22 kW, Baidi Khola 43 kW;

Year: January 2005 to December 2005;

Location: Nepal;

Main Project Features: Detailed Survey, Design and Drawing and Cost estimation of Hydropower Projects;

Position Held: Civil Engineer (Assistant Hydrologist);

Activities Performed: Responsible Hydrological analysis and Modeling: Installation of Automatic Hydrological Station with Telemetry, GLOF Studies, Climate change Studies etc, Delineation of catchment area, transportation and regional monthly flow, development of Flow Duration Curve (FDC) and annual hydrograph and estimation, mean annual flow and low flow (drought) analysis, maximum flood flow analysis, maximum and minimum estimation of design floods and development of rating curves and determining HFL and hydraulic modeling. hydraulic design of headworks including diversion weir, intake, gravel trap, de-sanding basin, penstock / tunnel inlet, tunnel, river diversion and protection works; **hydraulic design and cost estimation:** of headrace tunnel and canal, surge tank / forebay; penstock pipe including bends, Y and corresponding saddle, supports and anchor blocks; hydraulic design of powerhouse building and tailrace tunnel canal; flood protection measures; design of hydro-mechanical components including turbines, governor, press oil supply system, pressure air supply system, overhead travelling crane, draft tube, gates, openings, ligmings, bell-month, bends, expansion joints, Y-furcates etc. Activities under Team Leader and Close coordination with Deputy Team Leader/senior Hydrologist.

16. Name of Assignment or Project: Lower Parajul HPP (between 1MW to 5MW), Lohore HPP (between 1MW to 5MW), Tame Hydro Project (4MW);

Year: September 2002 to August 2004;

Location: Nepal;

Main Project Features: Detailed Survey, Design and Drawing and Cost estimation of Hydropower Projects;

Position Held: Civil Engineer (Assistant Hydrologist);

Activities Performed: Responsible Hydrological analysis and Modeling: Installation of Automatic Hydrological Station with Telemetry, GLOF Studies, Climate change Studies etc, Delineation of catchment area, transportation and regional monthly flow, development of Flow Duration Curve (FDC) and annual hydrograph and estimation, mean annual flow and low flow (drought) analysis, maximum flood flow analysis, maximum and minimum estimation of design floods and development of rating curves and determining HFL and hydraulic modeling. hydraulic design of headworks including diversion weir, intake, gravel trap, desanding basin, penstock / tunnel inlet, tunnel, river diversion and protection works; **hydraulic design and cost estimation:** of headrace tunnel and canal, surge tank / forebay; penstock pipe including bends, Y and corresponding saddle, supports and anchor blocks; hydraulic design of powerhouse building and tailrace tunnel canal; flood protection measures; design of hydro-mechanical components including turbines, governor, press oil supply system, pressure air supply system, overhead travelling crane, draft tube, gates, openings, ligmings, bell-month, bends, expansion joints, Y-furcates etc. Activities under Team Leader and Close coordination with Deputy Team Leader/senior Hydrologist.

PUBLICATIONS :

- N Devkota, S Lamichhane, PK Bhattarai "Navigating Uncertainties in Quantifying Water Availability Amidst the Climate and Land Use Changes". *Journal of Water Resources Management*, 2025
- Kabin Lamichhane, Saroj Karki, Keshab Sharma, Bharat Khadka, Biplav Acharya, Kamal Biswakarma, Sumit Adhikari, Rajan KC, Anusha Danegulu, Samana Bhattarai, Abhilasha Regmi, Mandip Subedi, Pawan Kumar Bhattarai "Unraveling the Causes and Impacts of Increasing Flood Disasters in the Kathmandu Valley: Lessons from the Unprecedented September 2024 Floods" *Natural Hazard Research* 2025
- Nirajan Devkota, Suraj Lamichhane, Pawan Kumar Bhattarai "Confronting uncertainty: The future of hydropower in the himalayan region amidst climate ambiguity" *Energy for Sustainable Development*, 2025
- Koshish Raj Maharjan, Utsav Bhattarai, Pawan Kumar Bhattarai, Laxmi Prasad Devkota "Climate change impacts on flood dynamics and seasonal flow variability in central Nepal: the Kaligandaki River Basin case" *Theoretical and Applied Climatology*, 2025
- Sanyam Ghimire, Umesh Singh, Krishna Kanta Panthi, Pawan Kumar Bhattarai "Spatial Sediment Erosion and Yield Using RUSLE Coupled with Distributed SDR Model, *Water* 2024
- Ghimire, S.; Singh, U.; Panthi, K.K.; Bhattarai, P.K. Suspended Sediment Source and Transport Mechanisms in a Himalayan River. *Water* 2024, 16, 1063. <https://doi.org/10.3390/w16071063>
- Devkota, Nirajan, Suraj Lamichhane, and Pawan Kumar Bhattarai. "Multi-site calibration of the SWAT hydrological model and study of spatio-temporal variation of water balance components in the Narayani River Basin, central part of Nepal." *H2Open Journal* (2024): h2oj2024084.
- Bhattarai, R., Bhattarai, U., Pandey, V. P., & Bhattarai, P. K. (2022). An artificial neural network-hydrodynamic coupled modeling approach to assess the impacts of floods under changing climate in the East Rapti Watershed, Nepal. *Journal of Flood Risk Management*, 15(4), e12852. <https://doi.org/10.1111/jfr3.12852>
- Bhattarai, T.N., Ghimire, S., Aryal, S. et al. Projected changes in hydro-climatic extremes with CMIP6 climate model outputs: a case of rain-fed river systems in Western Nepal. *Stoch Environ Res Risk Assess* (2022). <https://doi.org/10.1007/s00477-022-02312-0>
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