

Curriculum Vitae



Name: Sonu Khanal, Ph.D.
 First Name: Sonu
 Date of Birth: 28 January 1989
 Main Disciplines: Water and Climate, Integrated Water Resources Management, Climate Change and Risk Assessment, Climate Change Finance, Adaptation, Mitigation and Resilience, Hydropower development, Weather and Climate, Extremes, Remote sensing and Machine learning.
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Key Qualifications

S. (Sonu) Khanal (Ph.D.) has almost 14 years of experience providing technical leadership for projects related to water, food, energy, climate vulnerability and risk assessment, climate finance, adaptation, resilience to climate change, and water-energy-food nexus. His experiences were obtained at the Institute of Engineering (IOE, Nepal), International Centre for Integrated Mountain and Development (ICIMOD, Nepal), Practical Action Consulting, (PAC, Nepal), Royal Netherlands Meteorological Institute (KNMI, the Netherlands), Vrije Universiteit (VU, Amsterdam, the Netherlands) and FutureWater (the Netherlands).

Over the last few years, he focused on flood and drought risk studies in Asian and European catchments, climate change risk assessment, climate change finance, and policy frameworks, integrated water resource management, disaster risk reduction, implementation of nature-based-solution, operationalization of the probabilistic flood forecasting and multi-hazard early warning systems at different pilot basins with governmental institutions and forecasting drought impacts on crop yield and water supply systems using novel state-of-the-art machine learning techniques. He has international working experience in Europe, Asia, and Africa and has worked with several national and international clients and collaborators such as the World Bank, Asian Development Bank, National and Local Governments, River Basin Organizations, Science Foundations, Universities, and Research Organizations. Recently, he has been nominated as an expert for the UNFCCC Roster of Experts for Nepal.

Educational Background

2016 – 2021	Ph.D., Faculty of Science, Water and Climate Risk, Vrije University (VU), Amsterdam, The Netherlands.
2011 – 2013	Water Resources Engineering, Specialized in Hydropower Development, Institute of Engineering (IOE), Pulchowk Campus, Nepal
2007 – 2011	BE Civil Engineering, Institute of Engineering (IOE), Pulchowk Campus, Nepal

Selection of Theses, Internships

2021	Ph.D. Theses: Entitled <i>Compound drivers of hydroclimatic extremes in large river basins - Mapping future floods and water resources by modeling compound drivers at multiple spatial and temporal scales</i>
2014	Internship at ICIMOD under the project <i>Climate impacts on snow, glacier and hydrology of the HKH region</i> jointly implemented by ICIMOD, NASA, USGS with financial support from USAID/OFDA.
2013 – 2014	MSc. Thesis: <i>Snow and Glacier melt Quantization Using Energy Balance Model in Marshyangdi River Basin, Nepal</i> at IOE, Pulchowk Campus.
2011	B.E. Thesis: <i>Prefeasibility Study of LikhuKhola Hydropower Project</i> at IOE, Pulchowk Campus.

Professional Experience

10/2016 – present	Senior Hydrologist and climate change expert, Project Manager, FutureWater, Wageningen, The Netherlands
10/2016 – 11/2021	Researcher, Vrije University (VU), Amsterdam
01/2017 – 07/2017	Researcher, KNMI
02/2014 – 09/2016	Water Resources Modeller, ICIMOD, Nepal
05/2016 – 12/2016	Hydrologist, Practical Action Consulting (PAC), Nepal
04/2015 – 12/2015	Teaching Associate, MSc in Climate Change and Development Program, Tribhuvan University (TU), IOE, Pulchowk Campus, Nepal
05/2014 – 10/2014	Lecturer-Computational techniques in civil engineering, Department of Civil Engineering, National College of Engineering, Tribhuvan University, Nepal
08/2012 – 01/2014	Lecturer-Hydraulics and Irrigation engineering, Department of Civil Engineering, Himalayan Institute of Science and Technology, Purbanchal University, Nepal
02/2012– 06/2012	Lecturer-Survey methods in civil engineering, Kathford International College of Engineering and Management, Tribhuvan University, Nepal

Overseas Professional Experience

On-site:	Nepal, Netherlands, India, Spain, Italy, Mozambique, Myanmar, China, UK, Germany, Laos, Tajikistan, Kyrgyzstan, Brazil
Offline:	Georgia, Uzbekistan, Indonesia, Columbia, Pakistan

Selection of Assignments and Projects

FutureWater, the Netherlands

2024	Rapid Climate Risk and Adaptation Assessment for Solar-PV BESS (ADB):- This project will help ADB in preparing Rapid Climate Risk and Adaptation Assessment (CRA) and reflecting on climate adaptation measures for two Solar-PV BESS projects in Uzbekistan (Samarkand and Bukhara). The main activities are leading the project, performing a detailed climate risk adaptation assessment, and GHG emission assessment, proposing additional weather stations and associated capacity requirements for proper monitoring and surveillance in the project areas, identifying climate adaptation activities, calculating adaptation cost and good practices that can inform the design of climate change and resilience investments (Paris alignment, MDB), calculating the carbon footprint and cost of climate adaptation and mitigation and providing justification for the climate financing.
2024	Forestry Training Programme in India (GIZ): The overall objective of this project is to enhance the technical skills of senior forestry officials of GOI from four different states

(Himachal Pradesh, Uttar Pradesh, Madhya Pradesh and Uttarakhand) in India. The key responsibilities were to lead, design, organization, and implementation of training related to the valuation of ecosystem services, hydrological data collection and analysis, upstream-downstream dynamics, riparian succession and river health, and springshed management.

- 2024 Climate Risk and Adaptation Assessment for the Power Distribution Strengthening Project in Pakistan (ADB):- This project will help ADB and the government of Pakistan to assist the four major distribution companies, in preparing Climate Risk and Adaptation Assessment (CRA) and reflecting on climate measures when modernising the electricity distribution infrastructure. The main activities are leading the project, performing a detailed climate risk adaptation assessment, and GHG emission assessment, proposing additional weather stations and associated capacity requirements for proper monitoring and surveillance in the project areas, identifying climate adaptation activities, calculating adaptation cost and good practices that can inform the design of climate change and resilience investments (Paris alignment, SARD, MDB), calculating the carbon footprint and cost of climate adaptation and mitigation and providing justification for the climate financing.
- 2023 Nov – present WE-ACT (European Commission):- The WE-ACT (Water Efficient Allocation in a Central Asian Transboundary River Basin) project's overall goal is to demonstrate a Decision Support System (DSS) for water allocation in a Central Asian transboundary river to increase shared benefits and foster the adaptation of water resources management and planning to climate change. The key responsibilities are setting up a glacial-hydrological model (SPHY) for the Syr Darya river basin, hydro-meteorological/GIS/RS/Satellite data analysis and estimating the water demand and water footprints of the different users and activities within the Syr Darya river basin, assessing the effects of water allocation on water footprints, unmet water demand and environmental flow violations for both the status quo and future scenarios.
- 2023 – 2024 Early Warning System facility at ADB (ADB):- This project involves providing technical assistance to develop a comprehensive scoping report for a new Early Warning System (EWS) facility to enhance investments in EWS among developing member countries in the Asia Pacific. The key responsibilities are researching the rationale for the new facility, engaging in consultations with development partners, civil society, and the private sector, collaborating on climate and disaster impact assessments, reviewing sector-specific EWS applications, identifying barriers and opportunities for engagement, exploring partnerships and funding sources, and contributing to the scoping report, investment concept notes, and presentation summarizing key findings and recommendations.
- 2023 – present Roadside Spring Protection to Improve Water Security in Nepal (RoSPro):- The overarching goal of the project is to reimagine roads as instruments for landscape improvement rather than adversaries, harnessing road development to contribute positively to local water resources. By integrating techniques and tools (Digital twins and DSS toolkit), the project aims to ensure safe and reliable water supplies for people in mountain areas while safeguarding the quality of road infrastructure and maintaining connectivity. The main objectives of the project are (i) to identify and implement interventions to promote "Nature-based solutions" and "Green Roads for Water (GR4W)" approaches (ii) to generate evidence on the impact via cost-benefit analysis (iii) to develop digital twin and decision support toolkit (iv) capacity building, help in the sustainable development and generate a framework to upscale the approach at national and regional scales. The main responsibilities are to technically lead the project, to set up a framework for data-collection and monitoring, GIS/RS, development of digital twin and DSS system, generate policy briefs and upscaling strategy and capacity building.

2023 – present	Cryosphere monitoring and seasonal flow forecasting for integrated water resources management in Tajikistan (GIZ):- Tajikistan's Water Sector Reform Program aims to strengthen the water resources planning and allocation capacity across different river basin zones; however, lack of data on snow and glacier melt, climate change impacts on the cryosphere impedes the development of a robust IWRM plan. Thus, this project aims to fill the aforementioned information gap by improving the capacity to i) collect, assess, and use water supply data from snow and glacier melt, ii) perform hydrological modelling to inform water resources allocation and planning across sectors, and iii) capacity building of relevant stakeholders. The main responsibilities are to lead the project, data collection expedition (UAV flights on glaciers), glacio-hydrological modeling, IWRM, preparation of river basin master plan, flow forecasting and capacity building.
2023	Supporting Adaptation Decision Making for Climate Resilient Investments in Lao People's Democratic Republic (ADB):- This project aimed to improve understanding of the effective use of climate information and services to facilitate planning and decision-making under climate uncertainty. This capacity-building program aimed to enhance technical capacity to generate, interpret and apply climate information in decision-making in sectors including agriculture, water, and energy. The project also incorporated disaster risk management as a key component of building overall resilience. The main responsibilities were to prepare the training material and provide capacity-building training on DRR using climate risk tools developed under the project. Overall, 30 participants representing national, provincial, and educational institutions were trained.
2023	Climate Risk and Adaptation Assessment for the power sector reformation in Uzbekistan (ADB):- This project will help ADB and the government of Uzbekistan to assist the Joint Stock Company Regional Electric Power Networks (JSC REPN), in preparing Climate Risk and Adaptation Assessment (CRA) and reflecting climate measures when modernizing the electricity distribution infrastructure. The main activities are leading the project, performing a detailed climate risk adaptation assessment, and GHG emission assessment, proposing additional weather stations and associated capacity requirements for proper monitoring and surveillance in the project areas, identifying climate adaptation activities, calculating adaptation cost and good practices that can inform the design of climate change and resilience investments (Paris alignment, SARD, MDB), calculating the carbon footprint and cost of climate adaptation and mitigation and providing justification for the climate financing.
2023	Climate Risk and Adaptation Assessment for ADB funded 635 MW Dudhkoshi HEP, Nepal, Phase-2 (ADB):- This Climate Risk Assessment will address climate change mitigation and adaptation options in accordance with ADB's requirements for the Dudhkoshi Storage Hydroelectric Project (DKSHEP). This project will ensure the climate resilience measures are incorporated into the detailed design and environmental management planning. The main activities are leading the project, performing a detailed climate risk adaptation assessment, completing good practices that can inform the design of climate change and resilience investments (Paris alignment, SARD, MDB), calculating the carbon footprint and cost of climate adaptation and mitigation and capacity, liaising with the team of glacio-hydrologists, geologists, engineers and other experts and capacity building of the project team.
2022 – 2023	Climate Risk and Adaptation Assessment for the Energy sector in Uzbekistan (ADB): This project will help ADB, the government of Uzbekistan and the National Electricity Grid of Uzbekistan (NEGU) to assist to rehabilitate multiple 220 kV transmission lines totaling 950 km which have been in service for more than 50 years. The main activities are leading the project, performing a detailed climate risk adaptation assessment, and GHG emission assessment, proposing additional weather stations and associated capacity requirements for proper monitoring and surveillance in the project areas and

identifying climate adaptation activities, calculating adaptation cost, and providing justification for the climate financing.

- 2022 – present Strategic Climate Adaptation Planning for the Amu Darya Basin in Uzbekistan: This project will support ADB and the Ministry of Water Resources (MWR) of Uzbekistan in identifying key priorities for climate adaptation in the Amu Darya River basin and support the identification of investment areas within Amu Darya River basin. The major responsibilities are to conduct the basin-wide climate change risk assessment with an explicit focus on reducing systemic vulnerability to climate change. Identification of priority measures and portfolios for integration into subproject development as well as for future adaptation investment in the Amu Darya River basin.
- 2021 – present INCUBED: Towards an operational satellite-based Drought Early Warning and Forecasting System for quantifying risks of crop yield and water supply failures – This project supports the development and piloting of a decision support system targeting decision makers that need to take anticipatory actions on the seasonal scale to alleviate drought impacts. Seasonal outlooks are computed by a novel state-of-the-art Machine Learning technique. The main responsibilities are to collect data from the satellite observations, process Sentinel-2,3 information, and develop FFT models for crop yield and water supply cases.
- 2021 – present SDC-IWRM – This project contributes to an integrated climate-resilient water resource management approach; increases technical and institutional capacity in the fields of hydrological modeling, IWRM and DSS; supports the embedding of the IWRM approach tailored to glacier-fed Indian Himalayan subbasins in policies and provide generic outputs and guidelines to facilitate upscaling to other subbasins in the Indian Himalayan Region.
- 2021 Climate Risk Adaptation Assessment for ADB funded 635 MW Dudhkoshi HEP, Nepal: This Climate Risk Assessment evaluated the greenhouse gas (GHG) emissions, potential climate sensitivities and risks of the Dudhkoshi Storage Hydroelectric Project (DKSHEP) and identifies climate adaptation activities in accordance with ADB's requirements. This project provides an assessment of the current vulnerabilities and combines climate risk and other natural hazards relevant to hydropower using state-of-the-art CMIP6 projections and impact models.
- 2019 – 2023 Pan-Third Pole Environment project – The project assesses the impact of climate change on the Asian water towers and water resources together with the Utrecht University and Chinese Academy of Sciences. The project attempts to foster trade, infrastructural development, and cultural exchange between Central Asian countries and China. The major responsibilities are to assess the past and future hydro-climatic trends, develop a glacio-hydrological model for the entire high mountains of Asia encompassing 19 large basins, downscaling climate change projections, assess the impacts of climate change on the cryosphere and water resources, assess changes in the water supply and demand, provide adaptation and mitigation measures.
- 2019 NUFFIC Tailor-Made Training (Advanced cloud computing for water resources management) – One week of in-country training at Yangon Technological University, Myanmar. The training was focused on the application of open-source Google Earth Engine platform for the management of floods, drought, erosion, and sedimentation issues in Myanmar.
- 2016 – 2019 System Risk – A Marie-Sklodowska-Curie European Training Network which aims on developing and implementing a systems approach for large-scale flood risk assessment and management. The project assesses the risk chain, interactions, and temporal dynamics of large-scale floods.

2019	NUFFIC Tailor-Made Training (Google Earth Engine) – A three weeks in-country training for the Institute of Forestry (IOF) in Nepal. The training addresses the key challenges in managing the flooding issues in Nepal. The training involves the use of an open-source platform (google earth engine) for flood forecasting under changing climate.
2017 – 2018	Development of preprocessing toolbox of Big climate data (12 TB) using R. The project involves climate risk assessment of different regions in Indonesia, China, and Afghanistan using a data archive of the NASA-NEX project. For additional information visit https://nex.nasa.gov/nex .
2017 – 2018	Hydrological pre-feasibility assessment for the Romuku hydropower plant in Central Sulawesi, Indonesia. The project involves a hydrological assessment of this pre-feasibility phase, supporting Hydropower Evolutions in the overall assessment. The objective is to undertake a first-order analysis of the expected flow in data-sparse regions including the uncertainties involved in the proposed run-of-river power plant.
2017 – 2018	Hydrological pre-feasibility assessment for the Zoti hydropower plant in Northern Georgia. The project involves a hydrological assessment of this pre-feasibility phase, supporting Hydropower Evolutions in the overall assessment. The objective is to undertake a first-order analysis of the expected flow in data-sparse regions including the uncertainties involved in the proposed run-of-river power plant.
2017	Training for 23 water specialists from India, Nepal, Pakistan, Bhutan, Bangladesh, Afghanistan, and ICIMOD staff focusing on using the SPHY model and pre-processor GUIs for the Hindu-Kush Himalayan (HKH) region. The training aimed to implement the model in the HKH region to better understand the glacio-hydrological behavior, water availability, and impacts of climate change
2016 – 2017	Assessment of future changes in hydro-climatic extremes in the Upper Indus, Ganges, and Brahmaputra River basins. The objective of the project is to understand the climate change effects on the hydrological extreme in the IGB region.
2016 - 2017	Hydropower development assessment for the Tamakoshi River Basin – The objective is to improve the understanding of the expected impacts of climate change on water availability in the context of potential hydropower development in the Tamakoshi River Basin. This project involves the selection and statistical downscaling of GCMs, hydrological model calibration, improving SPHY model concepts focusing on glacier dynamics, and WEAP scenarios for hydropower development.
2016	NUFFIC Tailor-Made Training (SPHY modeling) – ARA-Sul and ARA-Norte in Mozambique faced a knowledge gap to adequately manage their water resources and to serve their clients. This training aims to equip these ARAs with additional knowledge to work with the SPHY model as a Water Resources Model.

Practical Action, Nepal

2016	Community-Based Early Warning Systems (CBEWS); supported by Zurich Global Flood Resilience Programme and UK Natural Environment Research Council (NERC) in collaboration with Lancaster Environment Centre, Lancaster University: Responsible for orienting and supporting the Department of Hydrology and Meteorology (DHM), Government of Nepal to improve the resilience of flood vulnerable communities. Support in testing the operational probabilistic flood forecasting model in the four major river basins in Nepal using the FloodforT toolkit and work alongside DHM in operating the system, and support in building the capacity of PAC to use the model. The FloodforT toolkit is currently operational on the DHM server and provides flood forecast for all the major basins in Nepal.
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ICIMOD, Nepal

- 2015 - 2016 Himalayan Adaptation, Water and Resilience (HI-AWARE) project, led by ICIMOD, as part of IDRC and DFID's CARIIAA programme: The Research Component 1 of HI-AWARE initiative intends to develop mountain-specific and basin-scale climate change scenarios in the HKH region. This component also assesses the climate change impact on water supply/demand in Indus Ganges and Brahmaputra river basins. One of the major responsibilities was to set up and calibrate the SPHY hydrological model in the selected catchments of IGB.
- 2015 – 2016 Koshi Basin Programme (KBP), supported by the Australian Government – Responsible for assessing water availability in the Koshi basin by applying various hydrological models viz. J2000, GR4JSG, SWAT and SPHY. Assessing the structural uncertainty due to different conceptualization approaches of the models.
- 2014 – 2015 Establishment of a Regional Flood Information System in the Hind-Kush Himalayan Region (HKH-HYCOS): supported by USAID/OFDA and in collaboration with World Meteorological Organization (WMO) - Responsible for the processing and analysis of hydro-met data and flood-related data, updating information database to ingest in HYCOS. Investigating the needs and examining the options for the improvement of programme aimed at strengthening the gathering, use and application of weather and climate information across South Asia for better decision-making. Providing technical support during the piloting of flood outlook in monsoon. Preparing training materials and conducting regional training on flood outlook development.
- 2014 - 2015 Integrated Hydrological Modelling HIMALA: Impacts on Snow Glacier and Hydrology of the Hind-Kush Himalayan Region; supported by USAID/OFDA and in collaboration with NASA - Responsible for conducting research on melt contribution from glacier and snow-fed catchments in Himalayan region, upstream-downstream linkages and water availability to the downstream users, river dynamics and hydrological modeling.

Tribhuvan University, Nepal

- 2015 Climate Change and Development Program: Involved in MSc course on Climate Change and Development under the department of science and humanities at the Institute of Engineering, Pulchowk campus, as a Teaching Associate. Responsible for giving lectures on "Impact of Climate change in Hydropower, Transport and Industry sector" and supported research on "Climate Change Induced Disasters and Management". Provided technical training on "Flood Risk and Hazard Mapping" using GIS and remote sensing tools, and hydrological and hydraulic models such as HEC-HMS and HEC-RAS to the MSc students.
- 2014 Part-time lecturer: Taught computational techniques in civil engineering at the department of Civil Engineering, National College of Engineering, Tribhuvan University, Nepal. Responsible for giving lectures and conducting practical related to the numerical methods for the final year students.

Purbanchal University, Nepal

- 2012 - 2013 Fulltime lecturer: Taught courses such as hydraulics and irrigation engineering at the department of Civil Engineering, Himalayan Institute of Science and Technology, Purbanchal University, Nepal. Responsible for giving lectures, conducting practical and field visits. Responsible for the supervision and examination of the final year projects. Responsible for training related to AutoCAD and GIS-based tools.

Trainer experience

2024	Training on the springshed management to the Department of Forestry, Uttarakhand, India (25 participants, in-country-one weeks)
2024	Training on use of the drone technologies to improve water management in Zarafshon River Basin in Tajikistan with a focus on climate change impact assessment on water resources, in GGP Glacier, Tajikistan (20 participants, in-country-two weeks)
2024	Training on glacio-hydrological and water allocation modeling for the Zarafshon River Basin in Tajikistan with a focus on climate change impact assessment on water resources, Tajikistan (15 participants, in-country-four weeks)
2023	Training on glacio-hydrological and water allocation modeling for the Zarafshon River Basin in Tajikistan with a focus on drone technologies, Tajikistan (19 participants, 1day virtual training)
2023	Training on glacio-hydrological and water allocation modeling for the Zarafshon River Basin in Tajikistan with a focus on drone technologies, Tajikistan (15 participants, in-country-two weeks)
2023	Training on glacio-hydrological modeling for IWRM for Central Water Commission, India (Delhi, India, 20 participants, in-country-one week).
2023	Training on glacio-hydrological modeling for IWRM for Central Water Commission, India (Training of trainers, 5 participants, 3 days virtual training).
2023	Capacity Building Training on Using Climate and Disaster Risk Information Tools for Enhanced Decision-Making in Lao PDR (Luang Prabang, Lao PDR, 30 participants, in-country-two days).
2022	Training on Integrated Water Resources Modelling Completed in India (Roorkee, National Institute of Hydrology, 20 participants, in-country-one week).
2019	NUFFIC Tailor-Made Training on Advanced cloud computing for water resources management in Myanmar (Yangon, Myanmar, 25 participants, in-country-one week).
2019	Training on Glacio-hydrological modeling (Chinese Academy of Sciences, Beijing, China, 30 participants, in-country-one week).
2019	NUFFIC Tailor-Made Training on the Use of open source data for hydrological modeling in data sparse region in Nepal (Pokhara, Nepal, 25 participants, in-country-three weeks).
2017	NUFFIC Tailor-Made Training on Glacio-hydrological modeling using the SPHY-model (ICIMOD, Kathmandu, Nepal) (Kathmandu, Nepal, 25 participants, in-country-one week).
2016	NUFFIC Tailor-Made Training on hydrological modeling using SPHY – ARA-Sul and ARA-Norte in Mozambique to bridge the knowledge gap to adequately manage their water resources and to serve their clients (Pemba, Mozambique, 20 participants, in-country-two weeks).
2016	Operational probabilistic flood forecasting training using FloodforT toolbox to support practical action consulting, Nepal and Department of hydrology and meteorology (DHM) to improve the resilience of flood-vulnerable communities (Kathmandu, Nepal, 20 participants, in-country-one week).

MSc and PhD Supervision

2024	Vera van der Veen, Utrecht University, MSc . Internship on “Sustainable hydropower potential assessment in Nepal” (Supervisor).
2024	Shankar Lamichhane, Asian Institute of Technology, PhD external supervisor, Title: Assessment of climate resilience of hydropower projects: a case study of Gandaki River Basin, Nepal.
2024	Lara van den Bos, Utrecht University, MSc . Internship on “Suitability assessment of the precipitation products for the hydrological applications in the HMA region” (Supervisor).
2023	Brecht D'Haeyer, Utrecht University, PhD supervisor (Co-promotor), Title: “The role of reservoirs in mitigating or escalating the impacts of climate change in the transboundary Syr Darya basin from a WEFE-nexus perspective”
2022	Roshan Singh Thagunna, MSc . (co-supervisor), Thesis on “Assessment of Climate Change Impact on River Flow in the Marshyangdi River Basin Using SPHY model”

2019 Smriti Tiwari, Wageningen University, **MSc** internship on 'Historical Climate analysis of the Third Pole Region' (Supervisor).

Awards and Grants

2016 Awarded Marie Skłodowska-Curie fellowship scholarship (grant agreement No 676027) by European Training Networks (ETN) to pursue Ph.D.

2011 Awarded prestigious government of Nepal scholarship to pursue Master of Water Resources Engineering specialized in hydropower development in the Institute of Engineering, Nepal

2007 Awarded prestigious government of Nepal scholarship to pursue Bachelor of Civil Engineering in the Institute of Engineering, Nepal

Additional Courses, Conferences and Presentation

2024 Sep Keynote presentation on "Integrated Water Resources Management in Bhagirathi Basin in India" during the India Water Week.

2024 Aug Live talk-show on "Drones and Modelling Tools Improve Water Management and Adaptation in Central Asia" during the Stockholm Water Week.

2024 Jun Keynote presentation on "Water and mountains – linking global, regional, and local perspectives" during the Dushanbe Water Conference.

2024 Feb Oral presentation on "Early Warning Systems Status, Investments, and Initiatives" for the Regional Workshop on Increasing Investments in Early Warning Systems organized by ADB in Bangkok. The workshop included representation from GCF, UNESCO, UNDRR, WMO, ESCAP, RIMES, AIIB, ITU, etc.

2023 Dec Keynote speech "Are we adapting? Integrating WEFE Nexus and climate services for effective climate change adaptation" at COP28 side event organized by the Ministry of Energy and Water Resources and Committee of Environmental Protection of the Republic of Tajikistan, GIZ, European Union, ADB, IHA, GCF.

2023 Oct Oral presentation on 'Glacio-hydrological and water allocation modeling for the Zarafshon River Basin in Tajikistan with a focus on drone technologies'.

2023 Jul Oral presentation on 'Glacio-hydrological modeling in the Indian Himalayas Region'.

2023 Mar Oral presentation for EU Global Action on Space.

2022 Nov Oral presentation NIH-Roorkee, India.

2022 Dec Oral presentation EU Global Action on Space.

2019 Dec Oral presentation at ITP-CAS, Beijing, China.

2019 Nov Oral presentation at Yangon Technical University conference, Myanmar.

2019 Sep Oral presentation at System Risk Conference GFZ, Potsdam, Germany.

2018 Dec Oral presentation at American Geophysical Union (AGU) conference, Washington DC.

2019 Jul Oral presentation at 'Event definition and characterization workshop' at TU Wein, Vienna.

2018 Apr Presented a poster at European Geosciences Union (EGU) conference, Vienna, Austria

2018 Jan Attended 4 days' training on the assessment of extreme events (methods and views from natural, engineering and policy perspectives) including quantification and communication of uncertainty, Middlesex University, UK.

2017 Dec Completed an 8-week course on Dynamic Meteorology and Atmospheric Sciences, at Wageningen University, Netherlands.

2017 Sep Presented a poster at International Conference on Flood Management, Leeds, UK

2017 July Attended 5 day's summer school in Environmental Systems Analysis using Bayesian inference, Eawag - Swiss Federal Institute of Aquatic Science and Technology, Zurich, Switzerland.

2017 June Attended a 4-day training on system interactions and coupled processes, exploratory modelling, Deltares, Netherlands

2017 Jan Attended 4 day-training on risk analysis and risk management concepts, University of Bologna, Italy.

2016 Oct Attended a 2-day workshop on planning and managing the project, German Research Centre for Geosciences (GFZ), Potsdam, Germany.

2015 Dec	Attended a 5-day training on Spatial Process on Hydrology (SPHY) model organized by Future water, Netherlands in collaboration with ICIMOD, held at ICIMOD
2015 Jul	Attended one-day workshop on “Urgent Case for Recovery: What can we learn from the August 2014 Karnali River floods in Nepal” organized by Practical Action and Institute for Social and Environment Transition (ISET-NEPAL).
2015 Jun	Attended a 2-day workshop on SWAT Model implications in Koshi held at ICIMOD.
2015 Mar	Attended a weeklong International Glacier Symposium (IGS) held in Kathmandu.
2014 Dec	Attended a 5 day-training on Spatial Process on Hydrology (SPHY) model organized by Future water, Netherlands in collaboration with ICIMOD, held at ICIMOD
2014 Sep	Attended a 15-day training on Advanced SWAT modelling organized by CREEW, Nepal.
2014 Jul	Attended International conference on Real-Time Flood forecasting system supported by DHI at ICIMOD.
2014 Jun	Attended training on the “Debris covered Glaciers” supported by DFID and the Norwegian Ministry of Foreign Affairs at ICIMOD.
2014 Feb	Attended a Regional Training on “Integrated Hydrological Modelling HIMALA: Impacts on Snow Glacier and Hydrology of the Hind-Kush Himalayan Region” supported by the International Development Office for Foreign Disaster Assistance (USAID OFDA) and in collaboration with NASA held at ICIMOD.

Language skills

Nepali:	Mother tongue
English:	Fluent in writing and speech
Hindi:	Fluent
Urdu:	Moderate
Dutch:	Moderate

Computer Skills

Hydrological models:	Spatial Processes in HYdrology (SPHY), PCRaster-based models, SWAT, Utah Energy Balance (UEB), Geospatial Stream Flow Model (GeoSFM), HEC-HMS, J2000, VIC.
Hydraulic models:	HEC-RAS, MIKE-11
Planning models:	HEC-RESSIM, WEAP
Programming:	R, Python, Fortran, C++
App development	R-Shiny, PyQt
GIS:	ArcView, ArcGIS, QGIS
Standard software:	MS Office, Open office, LaTeX
Cloud computing	Google Earth Engine
Others:	AutoCad, Civil3D, SAP2000

Selection of Technical Reports and Other Publications

Scientific publications

ANALYSIS: Acceleration of diverging runoff trends on the Third Pole submitted to Nature Climate Change as co-author (under review)

Sustainable hydropower potential in Nepal (under preparation)

Impact of climate change on water resources and energy sector in Nepal (under preparation)

Drought propagation in the Indus Basin and the importance of snow and ice melt in drought mitigation (under review)

Wijngaard RR, Oh H, **Khanal S**, Yoon A, van de Berg WJ and An S-I (2024) The associations of Tibetan Plateau spring snow cover with East Asian summer monsoon rainfall before and after 1990. *Front. Earth Sci.* 12:1385657. doi: 10.3389/feart.2024.1385657

Gyanwali, K., Adhikari, P., **Khanal, S.**, Adhikari, B., Raut, D. (2023). Indigenous resources contribution and influence of load curve shapes in the optimal growth of Bangladesh electricity sector. *Journal of Innovations in Engineering Education*, 6(1), 45–59. <https://doi.org/10.3126/jiee.v6i1.58802>

Dhaubanjari, S., Lutz, A. F., Pradhananga, S., Smolenaars, W., **Khanal, S.**, Biemans, H., Nepal, S., Ludwig, F., Shrestha, A. B., & Immerzeel, W. W. (2024). From theoretical to sustainable potential for run-of-river hydropower development in the upper Indus basin. In *Applied Energy* (Vol. 357, p. 122372). Elsevier BV.

Dhaubanjari S, Lutz AF, Smolenaars WJ, **Khanal S**, Jamil MK, Biemans H, Ludwig F, Shrestha AB and Immerzeel WW (2023) Quantification of run-of-river hydropower potential in the Upper Indus basin under climate change. *Front. Water* 5:1256249. doi: 10.3389/frwa.2023.1256249

Nepal, S., Steiner, J. F., Allen, S., Azam, M. F., Bhuchar, S., Biemans, H., Dhakal, M., **Khanal, S.**, Li, D., Lutz, A., Pradhananga, S., Ritzema, R., Stoffel, M., & Stuart-Smith, R. (2023). Consequences of cryospheric change for water resources and hazards in the Hindu Kush Himalaya. In ICIMOD (P. Wester, S. Chaudhary, N. Chettri, M. Jackson, A. Maharjan, S. Nepal, J. F. Steiner [Eds.]), *Water, ice, society, and ecosystems in the Hindu Kush Himalaya: An outlook* (pp. 73–121). ICIMOD. <https://doi.org/10.53055/ICIMOD.1031>

Gyanwali, K., Adhikari, P., **Khanal, S.**, Bhattarai, N., Bajracharya, T. R., Komiyama, R. and Fujii, Y.: Integrating glacio-hydrological and power grid models to assess the climate-resiliency of high mountain hydropower in Nepal, *Renew. Sustain. Energy Rev.*, 183, 113433, doi:10.1016/J.RSER.2023.113433, 2023.

Khanal, S., Tiwari, S., Lutz, A. F., Hurk, B. V. D., & Immerzeel, W. W. (2023). Historical Climate Trends over High Mountain Asia Derived from ERA5 Reanalysis Data, 263–288. <https://doi.org/10.1175/JAMC-D-21-0045.1>

Wang, L., Liu, H., Zhong, X., Zhou, J., Zhu, L., Yao, T., Xie, C., Ju, J., Chen, D., Yang, K., Zhao, L., Lu, S., **Khanal, S.**, Jin, J., Liu, W., Liu, B., Yao, X., Lei, Y., Zhang, G., Nepal, S., By, E. and Nelson, K. E.: Domino effect of a natural cascade alpine lake system on the Third Pole, *PNAS Nexus*, 1(3), doi:10.1093/PNASNEXUS/PGAC053, 2022.

Schröter, K., Barendrecht, M., Bertola, M., Ciullo, A., da Costa, R. T., Cumiskey, L., Curran, A., Diederer, D., Farrag, M., Holz, F., **Khanal, S.**, Manocsoc, M., Metin, D., Sairam, N., Shustikova, I. and Sosa, J.: Large-scale flood risk assessment and management: Prospects of a systems approach, *Water Secur.*, 14, 100109, doi:10.1016/J.WASEC.2021.100109, 2021.

Khanal, S., Lutz, A. F., Kraaijenbrink, P. D. A., van den Hurk, B., Yao, T. and Immerzeel, W. W.: Variable 21st Century Climate Change Response for Rivers in High Mountain Asia at Seasonal to Decadal Time Scales, *Water Resour. Res.*, 57(5), e2020WR029266, doi:10.1029/2020wr029266, 2021

Khanal S, Ridder N, de Vries H, Terink W and van den Hurk B (2019) Storm Surge and Extreme River Discharge: A Compound Event Analysis Using Ensemble Impact Modeling. *Front. Earth Sci.* 7:224. doi: 10.3389/feart.2019.00224

Khanal, S.; Lutz, A.F.; Immerzeel, W.W.; Vries, H.; Wanders, N.; Hurk, B. The Impact of Meteorological and Hydrological Memory on Compound Peak Flows in the Rhine River Basin. *Atmosphere* **2019**, *10*, 171.

Wijngaard, R.R., A.F. Lutz, S. Nepal, **S. Khanal**, S. Pradhananga, A.B. Shrestha, W.W. Immerzeel. 2017. Future changes in hydro-climatic extremes in the Upper Indus, Ganges, and Brahmaputra River basins. *PLOS ONE* 12(12): e0190224.

Technical reports

Khanal, S. 2023. Climate Risk Adaptation Assessment for Dudhkoshi HEP, Nepal. FutureWater Report 255.

Khanal, S., T. Imran, C. Nolet. 2023. Climate Risk and Adaptation Assessment for the Electricity Distribution Infrastructure in Uzbekistan. FutureWater Report 254.

Khanal, S., T. Imran, C. Nolet. 2023. Climate Risk and Adaptation Assessment for Digitize to Decarbonize – Power Transmission Grid Enhancement Project – Uzbekistan. FutureWater Report 243.

Kraaijenbrink, P., Immerzeel, W., **Khanal, S.**, Lutz, A. 2023. An assessment of water-related climate change impacts on the Third Pole. FutureWater Report 256.

Droogers, P., **Khanal, S.**, Hunink, J. 2022. Water allocation modeling for Bhagirathi Basin, India. FutureWater Report 253.

Khanal, S., Nick, F., Fiddes, J., Kraaijenbrink, P., Immerzeel, W., Hunink, J. 2022. Present-day and future changes in the hydrology of the Bhagirathi Basin. FutureWater Report 252.

Khanal, S. 2021. Climate Risk Adaptation Assessment for Dudhkoshi HEP, Nepal. FutureWater Report 242.

Contreras, S., C. Nolet, **S. Khanal**, A. Fernández, G.W.H. Simons. 2022. InfoSequia-4CAST: Report on InfoSequia Monitor Upgrading. FutureWater Report 235.

Contreras, S., G. Guimarães, A. Fernández, **S. Khanal**, G.W.H. Simons. 2022. InfoSequia-4CAST: Report on InfoSequia-4CAST Development. FutureWater Report 234.

Contreras, S., G. Guimarães, G.W.H. Simons, C. Nolet, J.Beard, **S. Khanal**, A. Fernández. 2021. InfoSequia-4CAST: Baseline Design Report. FutureWater Report 228.

Khanal, S., J.E. Hunink. 2017. Hydrological pre-feasibility assessment for hydropower facility in Northern Georgia. FutureWater Report 175.

Terink, W., W.W. Immerzeel, A.F. Lutz, P. Droogers, **S. Khanal**, S. Nepal, A.B. Shrestha. 2017. Hydrological and Climate Change Assessment for Hydropower development in the Tamakoshi River Basin, Nepal. FutureWater Report 164.

Terink, W., **S. Khanal**. 2016. SPHY: Spatial Processes in Hydrology. Advanced training: input data, sensitivity analysis, model calibration, and scenario analyses. FutureWater Report 160.