Kashish Sadhwani

Postdoctoral Fellow at IIT-Bombay, India

Date of Birth: March 31, 1993

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Interests

- Hydrological Extremes
- Floods and Droughts
- Climate change and Landuse change
- Hydrological Modelling
- Risk Assessment
- Hydroinformatics

Skills

Programming:
MATLAB, R, Python, C++, LaTex

Operating System:
Windows, Linux

Software:
ArcGIS, QGIS, ERDAS, IDRISI TerrSet, Google Earth Engine

Hydrological Models:
SWAT, VIC, HEC-HMS, HEC-RAS, MIKE+, MIKE Flood, GeoFrame

Summary

Experienced Doctoral Researcher with a demonstrated track record of extensive research in the field of Hydrology, Remote Sensing, and Water Resources Management. Skilled in Climate change and Landuse change analysis, water distribution/ sewerage system designs, Flood and Drought Monitoring, Hazard analysis, Disaster Risk Reduction, and Hazard Mitigation.

Education

2018 – 2024 **Ph.D. in Water Resources Engg.** — **IIT Bombay**
Title: Assessment on the Impacts of Climate and LULC Change on Hydrological Extreme Events at Regional and River Basin Scale.
Supervisors: Prof. T. I. Eldho and Prof. Subhankar Karmakar

2016 – 2018 **M.Tech. in Water Resources Engineering** — **MANIT Bhopal**
Title: Hydrologic Assessment of Rainfall-Runoff relation for Tapi Basin using Soil and Water Assessment Tool (SWAT) and ArcGIS approach.
Supervisor: Prof. Tanweer Desmukh
Grade: CGPA: 8.81/10

2011 – 2015 **B.E. in Civil Engineering** — **LNCT Bhopal, RGPV**
Title: Redesigning of traffic signal and road geometry of trisection at Charimli and Kolar Road, Bhopal.
Supervisor: Prof. Vijay Solanki
Grade: CGPA: 8.05/10

Training/Awards

2024 & 2023 **Climate Change AI** — **Climate Change AI**
Title: Summer School in 2024 & 2023
(Duration: 20 June - 2 August, 2024 ; 23 June - 26 July, 2023)

2024 **GeoFrame** — **IIT B/Uni. of Trento**
Title: Summer School 2024
(Duration: 25 - 31 July, 2024)

2023 **GPM 2023 Mentorship Program** — **NASA**
Title: Lecture series on state-of-the-art Precipitation Estimates and GPM applications
Title: Capstone Project in collaboration with NASA Scientists
(Duration: 1 March - 30 May, 2023)

2021 **Internship with Danish Hydraulic Institute (DHI)** — **DHI**
Title: Applications of MIKE+ Water Distribution & Collection Systems
(Duration: 6 months, Grade: A)

2019 **Indian National Committee on Climate Change (INCCC) Workshop** — **INCCC**
Title: Impact of Climate Change on River Basins using VIC model: A Case Study on Tadri to Kanyakumari River Basins
Title: Demonstrated tutorial and hands-on exercise on TerrSet Land Change Modeler software

2018 **International SWAT Conference and Workshops** — **IIT Madras**
Title: Advanced SWAT (SWAT-CUP) Workshop

2015 **2nd runner up at National Paper Presentation Competition** — **IIT Madras**
Title: Soil Stabilization using Glass cullet of various size

Project Experience

Ph.D. Research Highlights

Supervisors: Prof. T.I. Eldho and Prof. Subhankar Karmakar (Aug 2018-Aug 2024)

- Conducted in-depth analysis of the impact of climate change on drought characteristics and drought propagation from meteorological to hydrological droughts.
- Developed a flood-prone area detection model using Synthetic Aperture Radar (SAR) imagery, flood conditioning factors, and advanced machine learning in GIS with Google Earth Engine.
- Executed a comprehensive assessment of the impact of climate change and land use/land cover alterations on water balance components. Utilized the SWAT model to investigate these intricate relationships.

Metrics

Profiles

Languages

English (Full Proficiency)

Hindi (Full Proficiency)

Sindhi (Native)

German (Intermediate Proficiency)

Spanish (Elementary Proficiency)

Positions of Responsibility

Session Co-Chair: Ocean Sciences Meeting (OSM24) (18-23 Feb 2024)

Sports Secretary Hostel 13 @IIT-B (2021 - 2022)

Institute Research Scholar Companion Program (IRSCP)- Department Coordinator: Department of Civil Engineering @IIT-B (2019 - 2020)

Mess Secretary Hostel 16 @IIT-B (2018 - 2019)

- Led a study to project land use changes in the Western Ghats region of India, employing cutting-edge Artificial Neural Network (ANN) algorithms to forecast dynamic transformations in land use patterns.

INCCC Project

Received Ph.D. funding by the Ministry of Water Resources, River Development, and Ganga Rejuvenation, Government of India (GOI) to undertake the project titled: "Impact of LULC and climate change on water resources in river basins from Tadri to Kanyakumari."

PI: ***Prof. T.I. Eldho*** *(Aug 2018-April 2022)*

- Analyzed the impacts of climate shifts and changes in land use and land cover on hydrological parameters within the historical and projected periods (up to 2100).
- This analysis encompassed a holistic approach, integrating the VIC hydrological model for the broader context of the Western Ghats, and utilizing SWAT specifically for a detailed case study focusing on the river basin scale of the Periyar river basin in Kerala, India.
- Evaluated shifts in frequency and characteristics of meteorological and hydrological droughts in the Western Ghats resulting from climate change.
- Assessed changes in flood frequency and identified flood-prone areas in the Western Ghats due to climate change.

Global Precipitation Measurement (GPM) Mission Capstone Project

Program Coordinator: National Aeronautics and Space Administration (NASA)
Project Mentor: ***Dr. Jackson Tan*** *(April 2023-June 2023)*

- Compared effect of time zone shift in the IMERG rainfall estimates.
- Demonstrated that the variation in GPM-IMERG and IMD data is nominal for India, making it a suitable rainfall input for study.

Publications

Journals

- **Sadhwani, K.** and Eldho, T. I. (2023). Assessing the Effect of Future Climate Change on Drought Characteristics and Propagation from Meteorological to Hydrological Droughts - A comparison of Three Indices. Water Resources Management, 1-22. 10.1007/s11269-023-03679-7
- **Sadhwani, K.** and Eldho, T. I. (2023). Assessing the Vulnerability of Water Balance to Climate Change at River Basin Scale in Humid Tropics: Implications for a Sustainable Water Future. Sustainability, 15(11), 9135, 10.3390/su15119135
- **Sadhwani, K.**, Eldho, T. I., and Karmakar, S. (2023). Investigating the influence of future landuse and climate change on hydrological regime of a humid tropical river basin. Environmental Earth Sciences, 82(9), 210, 10.1007/s12665-023-10891-6
- **Sadhwani, K.**, Eldho, T. I., Jha, M. K., and Karmakar, S. (2022). Effects of Dynamic Land Use/Land Cover Change on Flow and Sediment Yield in a Monsoon-Dominated Tropical Watershed. Water, 14(22), 3666,10.3390/w14223666
- Sadhwani, K. and Eldho, T. I. Machine Learning-Driven Flood Hazard Assessment: Integrating SAR and Elevation data for Inundation Mapping and Depth Estimation. *(manuscript under preparation)*

References

- **Prof. T. I. Eldho**,
  Department of Civil Engineering,
  Indian Institute of Technology Bombay, Powai, Mumbai, India
  Contact: eldho@civil.iitb.ac.in,
  +91 22 2576 7339
- **Prof. Subhankar Karmakar**,
  Department of Environmental Science and Engineering,
  Indian Institute of Technology Bombay, Powai, Mumbai, India
  Contact: subhankar.karmakar@gmail.com