

SANDESH RAI

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PROFESSIONAL SUMMARY ENHANCEMENT

Agricultural Engineer with an MSc in Climate Change and Development and research experience in climate modeling, irrigation water management, geospatial analysis, and data-driven environmental assessment. Skilled in Python, R, GIS, and quantitative analysis with experience handling large climate and hydrological datasets. Strong interest in precision agriculture, remote sensing, machine learning, and digital agriculture applications for sustainable food production. Demonstrated research productivity through peer-reviewed publications and conference presentations. Seeking to contribute to innovative research in data-driven agricultural systems through doctoral studies.

EDUCATION

Master in Climate Change and Development, Tribhuvan University April 2023- April 2025
Relevant Coursework: Climate Science, Climate Change Modeling, Research Methodology, Climate Change Adaptation and Mitigation, Community Based Adaptation, Impact of Climate Change on Sustainable Development

Thesis: Assessment of Climate Change Impact on Future Water Availability and Irrigation Demand: A Case Study of the Chanda Mohana Irrigation Project, Nepal <https://elibrary.tucl.edu.np/items/60c7d1d9-7f65-4d85-9973-a131b7d42506>.

- Bias correction of climate models (GCMs)
- Climate projection analysis under SSP scenarios
- Crop Water Requirement (CWR) modelling
- Irrigation Water Requirement (IWR) estimation
- Statistical Analysis using R
- GIS-based watershed and irrigation command area analysis

Bachelor in Agricultural Engineering, Tribhuvan University 2017 - 2022
Relevant Coursework: Hydrology and Agricultural Meteorology, Soil and Water Conservation Engineering, Irrigation and Drainage Engineering, Climate Change and Adaptation Measures, Remote Sensing and GIS, Probability and Statistics, Agricultural Mechanization.

Thesis: Economic Analysis of Custom Hiring Center: A Case Study on Dipjyoti Krishi Yantrikaran Custom Hiring Center at Belaka-5, Udayapur District of Nepal.

PUBLICATIONS AND PRESENTATIONS

- Rai, S., & Chand, J. (2025). Applying the Clean Development MechanismAMS-III.R Methodology to Pig Manure Management: A Case Study of Dharan, Nepal. *International Journal of Research Publication and Reviews (IJRPR)*, 6(8), 4309–4316. <https://doi.org/10.55248/gengpi.6.0825.3118>
- Rai, S., Chand, J., Acharya, D. R., Poudyal, K. N. (2026). Assessment of climate change impact on future water availability and irrigation demand: A case study of the Chanda Mohana Irrigation Project, Nepal. *H2Open Journal*, 9(4), 100039. <https://doi.org/10.1016/j.htopen.2026.100039>
- Rai, S., Chand, J., Poudyal, K. N., Ghimire, A. (2025). *"How crop water requirements are projected to change with climate change in Chandra Mohan Irrigation Project in Nepal."* Proceedings of IOE Graduate Conference (16th), 2025.
 - "Assessed future irrigation demand to guide resilience programming for local food systems."

RESEARCH EXPERIENCE

**Master's Research,
IOE, Tribhuvan University**

- Analyzed historical hydro-meteorological data for rainfall and temperature trends
- Processed and bias-corrected climate projection data from multiple GCMs
- Assessed future climate scenarios under SSP245 and SSP585
- Estimated irrigation water demand under changing climate conditions
- Evaluated water availability and irrigation demand gaps
- Identified adaptation strategies to improve irrigation resilience
- Integrated climate and hydrological datasets for water resource assessment

Research Output

- Produced scenario-based estimates of future irrigation demand
- Identified potential climate-induced water scarcity risks
- Developed recommendations for climate-resilient irrigation planning

RESEARCH INTEREST

Irrigation System Optimization

Climate-Smart Agriculture

- Remote Sensing and GIS
- Agricultural Water Management
- Machine Learning Applications in Agriculture
- Environmental Data Analytics
- Digital Agriculture
- Precision Agriculture

TECHNICAL SKILLS

Software

- ArcGIS
- Python & R Programming
- MS Office (Word, Excel, Powerpoint)

Technical Areas

- Climate-Smart Agriculture & Resilience Programming
- Livestock & Food System
- Communication & Documentation

PROFESSIONAL EXPERIENCE

Technical Project Manager
Shubharamba Agrotech Pvt. Ltd.

April, 2025 - Till Now
Kathmandu, Nepal

- Greenhouse Structure Design
- Drip Irrigation Design

- Cold Storage Design

Technical Project Manager

Shanta Consultants Pvt. Ltd.

Dec, 2023 - Apr, 2025

Lalitpur, Nepal

- Led environmental assessments (IEE/EIA) for development and infrastructure projects.
- Conducted GIS-based spatial analysis and environmental mapping.
- Coordinated field data collection and environmental monitoring activities.
- Prepared technical reports and regulatory documentation for environmental compliance.
- Worked with multidisciplinary teams to integrate environmental safeguards into project planning.
- Managed environmental impact assessments and environmental compliance documentation.

Consulting Work as Agricultural/ Irrigation Engineer

Notion Engineering Consultancy Pvt. Ltd.

Dillibazaar, Kathmandu

- Consulting Services for Detail feasibility study of Kothway Majhi bastiko Baarima Sunkoshi Lifting ISP (5 ha.)
30 April 2024
- Consulting Service for Preparation & Submission of Complete Report as per TOR and Requirement (Chuwa Gaitarne Muhan Dudpakha Palika Aaspas hudai Panchami ISP, Athrai Tribeni-03, Hangpang, Taplejung) 16 Jan 2024
- Consulting Service for Detailed feasibility studies of Sisuwa Tatha Satisale Irrigation Sub-Projects, Myanglung Municipality-4, Terhathum 23 Dec 2021
- Consulting Service for Detail Feasibility Study of Sector Kulo Irrigation Sub-Project (80 ha.), Chhathar Rural Municipality- 2, Tehrathum 27 Aug 2023
- Consulting Service for Identification Studies of different Irrigation Sub-project under WRIDD, Taplejung' 15 Nov 2024

Consulting Work as Agricultural Engineer

Simikot Gaupalika, Humla

2024

5 June 2024

- Consulting Work for the purchase of Agricultural Mechanization, design of Technical Specification document.

Chauri Deurali Rural Municipality, Kavrepalanchok

11 April 2024

- Consulting Work for the purchase of Agricultural Mechanization, design of Technical Specification document.

CONFERENCE

Conference Presentation

- IOE Graduation Conference 2025
Presentaion:"How crop water requirements are projected to change with climate change in Chandra Mohan Irrigation Project in Nepal."
- International Conference 2026
Agricultural Engineering and Climate Smart Agriculture (5-6 February, 2026, Kathmandu, Nepal)

TRAINING & WORKSHOP & COURSES

Computational Tools for Climate Science, Neuromatch Academy (Online, 27th July, 2024) (2 Weeks)

- Certificate: <https://portal.neuromatchacademy.org/certificate/c0df063f-1afa-46be-bb17-ef0720738072>
- Covered Python programming, numerical methods, geospatial analysis (GIS), statistical and machine learning techniques for climate data, and scientific communication.
- Applied modern computational tools (Python, Jupyter, NetCDF) for climate and hazard modelling, data integration, and uncertainty analysis.

- Gained hands-on experience with large climate datasets, open-source geospatial tools, and reproducible workflows.

Workshop on Geographic Information System-QGIS, Tribhuvan University (19th July, 2024) (10 Days)

Insurance Surveyor Training in Motor Portfolio, Insurance Institute of Nepal (25th June, 2025) (3 Days)

Sustainability Literacy, The British College and Global Compact Nepal (4 Aug–15 Aug, 2025) (2 Weeks)

YECAP Nepal Shakers Fellowship 2025, UNDP and Youth Innovation Lab (20 Nov–24 Nov, 2025) (5 Days)

Youth Environmental Assembly 2025, The Youth and Children Major Group, UNEP Headquater, Nairobi, Kenya (29 Nov-30 Nov) (2 Days)- As a Youth Delegates.

Open-Ended Committee of Permanent Representatives (OECPR-7), United Nations Environment Program (UNEP), UNEP Headquater,Nairobi, Kenya (1-5 December 2025) (5 Days)-As a Youth Delegates.

The 7th Session of the United Nations Environment Assembly (UNEA-7), United Nations Environment Program (UNEP), UNEP Headquater,Nairobi, Kenya (8–12 December 2025) (5 Days)-As a Youth Delegates.

International Conference 2026 on Agricultural Engineering & Climate Smart Agriculture, NSAE & iDE, Nepal, Kathmandu Nepal (5-6 February, 2026) (2 Days)

Net Zero 101: What, Why and How, E-learning Course, United Nations University, Institute of the Advanced Study Sustainability (23 March 2026).

E-Learning course on monitoring air pollution effects under the Convention on Long-range Trans-boundary Air Pollution, United Nations Economic Commission for Europe(UNECE), (23 March 2026).

PROGRAMME ORGANIZED UNDER THE FUNDING OF CLEAN ENERGY NEPAL AND IN COLLABRATION WITH UNDP, NEPAL AND YOUTH INNOVATION LAP

- CLIMATE-RESILIENT SUSTAINABLE FARMING "From Soil to Sustainability: Building Climate-Smart Agriculture" (March 2026).

PROFESSIONAL MEMBERSHIP

- Nepal Engineers Association (NEA)
- Nepalese Society of Agricultural Engineers (NSAE)

LANGUAGES

- Nepali (Native)
- English (Fluent, Academic/Technical proficiency)
- Hindi (Fluent)

REFERENCES

1. Dr. Khem Narayan Poudyal,
Professor, Department of Applied Sciences and Chemical Engineering,
Pulchowk, Lalitpur, Nepal
Email: khem@ioe.edu.np
Phone: +977-984-146-5598
Relationship: Thesis Co-Supervisor Relationship: Thesis Supervisor
2. Dr. Er. Jeet B Chand,
National Agriculture Modernization Project,
Khumaltar, Lalitpur, Nepal
Email: jeetchand06@yahoo.com
Phone: +977-984-803-6666
Relationship: Thesis Supervisor

3. Sameer Shakya,
Assistant Professor, Department of Agricultural Engineering,
Purwanchal Campus, Dharan, Nepal
Email: sameershakya@ioepc.edu.np
Phone: +977-984-203-9411
Relationship: Thesis Supervisor