

Bishal Neupane

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RESEARCH INTERESTS

Precision agriculture, remote sensing and satellite imagery analysis, geospatial data science, crop monitoring systems, plant growth regulation, AI/ML applications in agricultural systems, biosystems engineering, and data-driven approaches to sustainable food production in South Asia.

EDUCATION

- **WorldQuant University (WQU)** Remote
Master of Science in Financial Engineering (MScFE) March 2026 – Present
 - **Program Focus:** Globally recognized MScFE program covering Financial Markets, Financial Data, and quantitative methods in financial engineering.
- **Agriculture and Forestry University (AFU)** Rampur, Nepal
Bachelor of Science in Agriculture; GPA: 3.12 April 2021 – Nov 2025
 - **Thesis:** Investigated effects of Auxin (NAA) and Gibberellic Acid (GA₃) on okra growth and yield under RCBD experimental design; GA₃ at 100 ppm identified as the most effective treatment.

RESEARCH EXPERIENCE

- **PMAMP Morang (Prime Minister Agriculture Modernization Project)** Nepal
Agricultural Research Intern Jan 2025 – Jul 2025
 - **Experimental Design & Field Research:** Designed and executed RCBD field experiments on 50+ okra plants across 3 hormone concentration levels; collected 200+ morphological and yield data points for statistical analysis.
 - **Statistical Analysis:** Applied ANOVA, LSD, and treatment comparison methods in R; achieved 15% yield improvement through data-driven hormone treatment optimization; produced publication-ready visualizations.
- **Open Mapping Hub Asia Pacific** Remote
Open Mapping Guru – GIS & Geospatial Research Jan 2024 – Present
 - **Geospatial Data Analysis:** Validated 5,000+ geographic data points achieving 20% improvement in mapping accuracy; corrected 300+ data points across 15+ regional datasets using Python-based GIS tools.
 - **International Collaboration:** Coordinated with 8 international researchers, increasing regional mapping data contributions by 40% over 6 months.
- **Independent Research & Development** Remote
Precision Agriculture & AI Researcher Aug 2024 – Present
 - **Remote Sensing Research:** Conducted multi-temporal satellite analysis using Google Earth Engine and Sentinel-2 imagery across 500+ hectares; computed NDVI, NDWI, SAVI, GCI, and PSRI indices for crop health and environmental monitoring.
 - **AI/ML in Agriculture:** Developed CNN-based crop disease detection system using TensorFlow and MobileNetV2; contributed GPS-tagged field data to Nepal Agricultural Disease Dataset (NADD).

RESEARCH & TECHNICAL PROJECTS

- **Agricultural Statistical Analysis Framework:** Engineered R-based statistical pipeline for multi-variable RCBD agricultural experiments using tidyverse, ggplot2, and agricolae. Implemented automated ANOVA, Duncan's MRT, and 4-panel diagnostic visualizations; achieved $p < 0.001$ significance for 96% of variables across 30+ collaborative research datasets.
- **Precision Agriculture Analysis – Kaski, Nepal:** Applied Google Earth Engine with Sentinel-2 imagery to classify 500+ hectares of agricultural land using K-Means clustering (85% accuracy across 6 land-cover classes); computed 5 vegetation indices for 200+ farm plots supporting precision farming and crop monitoring decisions.
- **NDWI Environmental Analysis – Pokhara Lekhnath:** Conducted multi-temporal NDWI satellite analysis using Sentinel-2 on Google Earth Engine to track seasonal water presence, identify persistent negative NDWI patterns, and map environmental changes supporting urban resilience and conservation research.
- **Crop Disease Detection System:** Developed mobile AI system using Flutter, FastAPI, TensorFlow, and MobileNetV2 CNN for field-based crop disease diagnosis. Integrated FAO/USDA treatment citations, offline TFLite inference, and GPS-tagged data contributing to Nepal Agricultural Disease Dataset (NADD).
- **NEPSE Stock Analysis & AI Prediction Engine:** Built full-stack data science platform (React 19, TypeScript, Node.js, PostgreSQL) applying ML-based time-series forecasting, pattern recognition, and 50+ quantitative screening filters across 1,000+ financial instruments.

TECHNICAL SKILLS

- **Research Computing:** R (tidyverse, ggplot2, agricolae, gvlma, R Markdown), Python (Pandas, NumPy, Scikit-learn, Matplotlib, Seaborn), ANOVA, RCBD, Duncan's MRT, PCA, Time-Series Analysis, Regression
- **Crop Modelling:** DSSAT v4.8.5 (CROPGRO, CERES), crop simulation, genetic coefficient calibration, decision support systems for agrotechnology transfer
- **Remote Sensing & GIS:** Google Earth Engine, Sentinel-2, Landsat, MODIS, NDVI/NDWI/SAVI/GCI/PSRI, K-Means Classification, GIS Analysis, OpenStreetMap, QGIS
- **AI & Machine Learning:** TensorFlow, Keras, MobileNetV2 (CNN), NLP, RAG Pipelines (ChromaDB), Google Gemini AI, ML Forecasting, Pattern Recognition
- **Data Engineering & Dev:** FastAPI, Django, Flask, React, Node.js, Flutter, PostgreSQL, MongoDB, SQLite, Docker, Git, GitHub
- **Scientific Tools:** Jupyter Notebook, RStudio, Anaconda, Google AI Studio, Google Cloud Platform, Power BI, Tableau, Advanced Excel

CERTIFICATIONS

- **Basics of Crop Modeling: Fundamentals and Applications:** NAXA & YES Agriculture – 5-day online training, Feb 10–14, 2025
- **Associate Data Scientist with Python:** DataCamp – Advanced Python data science libraries, statistical modeling, and ML workflows
- **Google Data Analytics Certificate:** Google – Data analysis, SQL, R programming, and visualization techniques
- **End-to-End Google Earth Engine:** Geospatial datasets, dynamic mapping, watershed and land-cover classification for Nepal
- **Elements of AI:** MinnaLearn – AI fundamentals and machine learning concepts

LANGUAGES

- **English:** Professional academic proficiency – research writing, scientific communication, and international collaboration
- **Nepali:** Native speaker

INVOLVEMENT

- **IAAS Nepal LC Puranchaur** Puranchaur, Kaski
VP of Communication *Feb 2022 – Nov 2025*
 - **Leadership:** Managed organizational communications, social media strategy, meetings, and data reporting for IAAS Nepal LC Puranchaur.
- **GAVS Puranchaur** Puranchaur, Kaski
Vice-Coordinator *Nov 2021 – Nov 2025*
 - **Field Coordination:** Organized workshops, managed social media content, and served as field coordinator for the agricultural student organization.

ACHIEVEMENTS

- **MScFE Admission – WorldQuant University:** Accepted into the globally recognized Master of Science in Financial Engineering program (March 2026).
- **National Exchange Coordinator Meeting:** Attended the “National Exchange Coordinator Meeting 2022” organized by IAAS Nepal LC Puranchaur.
- **Sports Achievement:** 1st place in Volleyball game at “Mitramani Memorial Sports Week 2080” organized by SV Puranchaur.