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

- **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 (GA_3) on okra growth and yield under RCBD experimental design; GA_3 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).

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

Publications & Manuscripts

11 peer-reviewed articles (2026); first author on 4, corresponding author on all 11; 1 further article accepted and in press. Google Scholar · ResearchGate

Peer-Reviewed Articles (* corresponding author)

1. Neupane, B.*, Upadhyaya, S., Chapagain, S., & Mishra, S. (2026). Influence of naphthaleneacetic acid and gibberellic acid on growth, flowering, and yield performance of okra (*Abelmoschus esculentus*) at Katahari, Morang, Nepal. *Turkish Journal of Agriculture – Food Science and Technology*, *14*(11), 3317–3323. doi:10.24925/turjaf.v14i11.3317-3323.8965
2. Thakur, L., Neupane, B.*, Chaudhary, M., & Katuwal, L. (2026). Comparative effects of organic and inorganic fertilizer amendments on growth and yield of spring rice (*Oryza sativa* L.) in Eastern Terai, Nepal. *Turkish Journal of Agriculture – Food Science and Technology*, *14*(11), 3340–3348. doi:10.24925/turjaf.v14i11.3340-3348.9038
3. Gupta, M., & Neupane, B.* (2026). Effect of different plant growth regulators on growth and yield of okra (*Abelmoschus esculentus* (L.) Moench) cv. Parbati in Sunsari District, Nepal. *Tropical Agroecosystems*, *7*(2), 59–64. doi:10.26480/taec.02.2026.59.64
4. Katuwal, L., Neupane, B.*, Thakur, L., & Chaudhary, M. (2026). Evaluation of rice (*Oryza sativa* L.) genotypes for growth and yield attributing traits in Eastern Terai, Nepal. *i TECH MAG*, *8*, 77–83. doi:10.26480/itechmag.08.2026.77.83
5. Pokharel, R., Neupane, B.*, Gyawali, D., & Sapkota, P. (2026). Effect of mulching materials on population dynamics of insect pests and natural enemies and on growth and yield of lettuce (*Lactuca sativa* L.) in Lalitpur, Nepal. *Tropical Agrobiodiversity*, *7*(2), 128–134. doi:10.26480/trab.02.2026.128.134
6. Neupane, B.*, Pandey, B., & Bhurtel, P. (2026). Effect of different concentrations of growth regulators on fruit retention and total soluble solids in mango (Bombay var.) in Nawalpur, Sarlahi. *Integrated Urban Food Systems*, 67–75. doi:10.26480/iufs.01.2026.67.75
7. Bhandari, N., Neupane, B.*, Chapagain, S., Ayer, R., & Dhakal, B. (2026). Farmers' perception of fall armyworm (*Spodoptera frugiperda*) and its management practices on maize in Chitwan District, Nepal. *Tropical Agrobiodiversity*, *7*(2), 121–127. doi:10.26480/trab.02.2026.121.127
8. Bhurtel, P., Neupane, B.*, Pandey, B., & Paudel, S. (2026). Factors influencing farmers' decision on sowing time and variety selection for spring season rice in Rautahat District, Nepal. *Tropical Agrobiodiversity*, *7*(2), 113–120. doi:10.26480/trab.02.2026.113.120
9. Roy, A. K., Wasti, D., & Neupane, B.* (2026). Comparative analysis of Chandani and Raja cucumber varieties in Morang District, Nepal. *Big Data in Agriculture*, *8*(2), 89–95. doi:10.26480/bda.02.2026.89.95
10. Neupane, B.*, Upadhyaya, S., Chapagain, S., & Chemjong, A. (2026). Agricultural mechanization status and adoption constraints in maize farming: Evidence from a hill municipality of Nepal. *Tropical Agrobiodiversity*, *7*(2), 83–90. doi:10.26480/trab.02.2026.83.90
11. Neupane, B.*, Chemjong, A., Upadhyaya, S., Chapagain, S., & Rai, I. (2026). Rice mechanization in Nepal: Status, challenges, and pathways toward sustainable agricultural transformation—A review. *Tropical Agrobiodiversity*, *7*(1), 61–68. doi:10.26480/trab.01.2026.61.68

Accepted / In Press

- Chapagain, S., Neupane, B.*, Wagle, N., Timilsina, R. H., Bhattarai, P., & Poudel, A. (in press). Organic versus inorganic fertilization of summer squash (*Cucurbita pepo* L.) under mid-hill conditions of Nepal: Growth, yield, and fruit quality responses. *Turkish Journal of Agriculture – Food Science and Technology* (accepted October 2026; in copyediting).

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

- **National Exchange Coordinator Meeting**: Attended the "National Exchange Coordinator Meeting 2022" organized by IAAS Nepal LC Puranchaur.