

Poonam Karki

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EDUCATION

Master of Science in Sustainable Agriculture

2022-2024

GPA: 4.0 *Lincoln University of Missouri, USA*

Thesis title: Integrating Living Perennial Cover Crops into Organic Vegetable Systems: Impacts on Soil Health and Cover Crop Biomass Production

Bachelor of Science (Honors) in Agriculture

2016-2020

GPA: 3.82. Honor Roll Student. *Purbanchal University, Nepal*

Thesis title: Effect of Maleic Hydrazide and Gibberellic Acid on Growth and Yield of African Marigold (*Tagetes erecta* L.) cv. Calcuttia Orange

PROFESSIONAL AND RESEARCH EXPERIENCE

Soil Technician

July 2024- Present

Department of Agriculture and Environmental Sciences, Lincoln University of Missouri.

- Conduct soil biochemical and physiological assays linking microbial function to nutrient cycling, including extracellular enzyme activities, ACE protein, and labile C & N pools.
- Contribute to PFAS soil analysis workflows, including soil sampling design, sample handling, and interpretation of LC-MS/MS-based data.
- Analyze microbial community structure using QIIME2, integrating microbial patterns with soil biochemical processes.
- Quantify aboveground biomass and assess plant tissue nutrient composition (C/N ratio, crude protein and total digestible nutrients) to integrate plant nutrient cycling with soil microbial function.
- Apply statistical and multivariate modeling (R, SAS) to evaluate treatment-level differences in soil health indicators and microbial activity.
- Lead the soil sampling effort for field trials, ensuring a systematic and accurate collection of soil samples across diverse locations and conditions.
- Collaborate with researchers, extension specialists, and stakeholders to translate findings into applied recommendations.

Graduate Research Assistant

August 2022- June 2024

Department of Agriculture and Environmental Sciences, Lincoln University of Missouri.

- Performed a full suite of soil biochemical analyses, including extracellular enzyme activities, ACE soil protein, soil organic carbon, total nitrogen, potentially mineralizable nitrogen, and microbial activity assays.
- Conducted microbial community profiling (16S/ITS amplicon sequencing) and supported downstream bioinformatics workflows.
- Communicated research findings through field days, grower workshops, and scientific conferences.
- Developed educational materials to support adoption of regenerative soil management practices.

Research Technician

June 2021- July 2022

Kisan Care Pvt. Ltd.

- Supported the dissemination of ecological and soil-based management practices such as biofertilizers, cover cropping, legume intercropping, and mixed cropping to commercial vegetable growers.
- Conducted field-level training for over 500 farmers in the Kathmandu valley, equipping them with practical skills in sustainable agriculture.

- Collaborated with senior staff and members of Kisan Care team to draft various reports, correspondence, and documentation, summarizing periodic findings and the main insights into the project.

Research Intern

Floriculture Department Center

August 2020- January 2021

- Evaluated the effects of growth regulators (Maleic Hydrazide and Gibberellic Acid) on African marigold growth and yield, linking plant physiological responses to management-driven changes in productivity.
- Communicated findings and implications for marigold cultivation, offering valuable guidance for farmers interested in enhancing productivity through targeted growth regulator applications.

PUBLICATIONS

Karki P., Hurisso T., Reinbott T. (2025). Soil health responses to annual versus perennial cover crops in alleyways during vegetable-based organic transition. (Manuscript under review, Agronomy Journal)

Karki P., Hurisso T., Reinbott T. (2025). Microbial community structure responses to perennial and annual cover crops during transition to organic vegetable production. (Under review)

Kwarteng A., **Karki P.**, Hurisso T., Reinbott T. (2025). Exploring how perennial cover crops alter above and below ground weed communities during vegetable-based organic transition. (Under review)

Karki P., Atreya P.N., Shrestha S (2021). Effect of Maleic Hydrazide and Gibberellic Acid on growth, and yield of African marigold (*Tagetes erecta* L.) cv. Calcuttia Orange. *Fundam Appl Agric* 6(3): 272–278, 2021 doi: 10.5455/faa.103177

PRESENTATIONS

Karki P., Hurisso T., Reinbott T. Soil health comparison of annual versus perennial cover crops in alleyways between vegetable production beds during organic transition. Poster presented at Soil Health Institute's 10th Anniversary Virtual Meeting. 3rd December 2025- 4th December 2025.

Karki P., Hurisso T., Reinbott T. Assessing the Effect of Living Cover Crops in Alleyways on Soil Health Properties of Adjacent Organic Vegetable Production Rows. Poster presented at 2025 ASA, CSSA, SSSA International Annual Meeting. 9th November 2025- 12th November 2025, Salt Lake City, UT, USA

Hurisso T., **Karki P.**, Reinbott T. Soil Health Comparison of Living Perennial versus Annual Cover Crops during Transition to Certified Organic Vegetable Production. Poster presented at MarbleSeed Organic Farming Conference, 20th February- 22nd February 2025, La Crosse, WI, USA.

Al-Awwal N., **Karki P.**, Hurisso T. Making Sense of the Soil Health Testing. Minority and Limited Resources Farmers and Producers Conference. 12th September -13th September 2024, Sikeston, MO, USA.

Karki P., Hurisso T., Reinbott T. Integrating Living Perennial Cover Crops into Organic Vegetable Systems: Impact on Soil Health and Cover Crop Biomass Production. Poster presented at 1890 ARD Research Symposium. 7th April – 9th April 2024, Nashville, TN, USA.

Karki P., Hurisso T., Al-Awwal N., Reinbott T. Gerling T. Soil Health and Vegetable Yield Responses to Perennial versus Annual Cover Crops in Traffic Pathways. Poster presented at 2024 Great Plains Growers Conference: 11th January 2024- 13th January 2024, St Joseph, MO, USA.

Karki P., Hurisso T., Al-Awwal N., Reinbott T. Evaluation of Labile C and N Indicators of Soil Health after 2 years of Living Perennial and Annual Cover crops during organic vegetable transition. Poster presented at: 2023 ASA, CSSA, SSSA International Annual Meeting. 29th October- 1st November 2023, St. Louis, MO USA

Al-Awwal N., Adeyeye A., **Karki P.**, Tesfaye S., Hurisso T. Soil Health Characteristics across a Gradient of Organic Land-Use Intensity in Mid-Missouri. Poster presented at: 2023 ASA, CSSA, SSSA International Annual Meeting. 29th October- 1st November 2023, St. Louis, MO USA

Al-Awwal N., **Karki P.**, Hurisso T. Making Sense of the Soil Health Testing. Minority and Limited Resources Farmers and Producers Conference. 28th September -29th September 2023, Sikeston, MO, USA.

Karki P., Atreya P.N., Shrestha S. Effect of Maleic Hydrazide and Gibberellic Acid on growth, and yield of African marigold (*Tagetes erecta* L.) cv. Calcuttia Orange. Poster presented at: 12th National Horticultural Seminar-2021. 4th March-5th March, 2021, Kirtipur Kathmandu.

CORE COMPETENCIES & SKILLS

Microbial & Biogeochemical Skills

- Extracellular enzymes (β -glucosidase, N-acetyl β -glucosaminidase, acid phosphatase, arylsulfatase, dehydrogenase), ACE soil protein, soil organic carbon, total nitrogen, mineralizable carbon, permanganate oxidizable carbon, potentially mineralizable nitrogen
- Microbial community profiling using PLFA and 16S/ITS amplicon sequencing
- Aboveground biomass and nutrient indices (crude protein, total digestible nutrients, and C/N ratio)

Environmental Contaminants & PFAS (Developing Expertise)

- Fundamentals of PFAS chemistry, environmental behavior, and exposure pathways
- Soil sampling considerations for PFAS analysis
- Familiarity with LC-MS/MS principles for PFAS detection and quantification
- Integration of PFAS analytical results with soil biogeochemical and microbial data

Biochemistry & Molecular Skills

- DNA/RNA extraction and purification.
- Enzyme activity quantification and basic enzyme kinetics interpretation.
- Basic protein assays (colorimetric/absorbance-based assays) and microbial/sterile techniques.

Computational & Data Skills

- Statistical analysis and modeling (R, SAS, Python, GenStat, Minitab)
- Microbiome data processing in QIIME2; spatial data analysis in ArcGIS

KEY ACCOMPLISHMENT

- Third position in “Soil health comparison of annual versus perennial cover crops in alleyways between vegetable production beds during organic transition” Poster Competition organized by Soil Health Institute, 2025.
- Third position in “Integrating Living Perennial Cover Crops into Organic Vegetable Systems: Impact on Soil Health and Cover Crop Biomass Production” Poster Competition organized by 1890 ARD Research Symposium, 2024.
- First position in “Evaluation of Labile C and N Indicators of Soil Health after 2-years of Living Perennial and Annual Cover crops during organic vegetable transition” Poster Competition organized by Organic Management Systems Community, ASA-CSSA-SSSA, 2023.

CERTIFICATIONS

- Biology meets Programming: Bioinformatics for Beginners authorized by University of California, San Diego and offered through Coursera 2025.
- Fundamentals of GIS authorized by University of California, Davis and offered through Coursera 2021.
- Sustainable Agricultural Land Management authorized by University of Florida and offered through Coursera 2020.

REFEREES

- Tunsisa Hurisso, PhD
Associate Director of Research, Associate Professor, Soil and Watershed Management
Lincoln University of Missouri.
HurissoT@lincolnu.edu
- Qingbo (Roger) Yang, PhD
Assistant Professor, Chemistry
Lincoln University of Missouri.
YangQ@LincolnU.edu
- Timothy Reinbott
Director, MOAES Communications and Construction Services, Agricultural Experiment Station
University of Missouri.
reinbottt@missouri.edu