DINESH GULATI

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https://hydroagrinexus.com/

EDUCATION

Ph.D. in Water Resources University of Idaho, ID **GPA:** 4.00	Aug 2023-Present

    Dissertation: "Climate-smart agriculture impacts on agro-hydrological variables"

    Advisor: Dr. Meetpal S. Kukal

Master of Technology in Soil and Water Engineering Punjab Agricultural University, India **GPA:** 3.32	Apr 2021

    Thesis: "Simulation of groundwater recharge from transplanted and direct seeded rice fields"

    Advisor: Dr. Sanjay Satpute

Bachelor of Technology in Agricultural Engineering Punjab Agricultural University, India **GPA:** 3.22	June 2018

    Project: "Comparative field evaluation of different straw management technologies in combine harvested paddy fields under different straw conditions"

    Advisor: Dr. M.K. Narang

RESEARCH EXPERIENCE

Graduate Research Assistant *University of Idaho, ID*	Aug 2024-Present

- Working on adding more functionalities to the pyfao56 package, such as basal crop coefficient (Kcb) adjustments for the upcoming version.
- Developed a Python-based function to separate the sources of crop uptake into blue and green water sources.
- Evaluating the impact of feasible SOC enhancement from different conservation practices on agro-hydrological variables under multiple soil types, climates, and irrigation management.
- Working on a framework for integrating the simulation, remote sensing, and on-field measurement data to enhance soil-water-plant interaction analysis.
- Developed various pyfao56 custom modules for our research, including crop growth and maturity based on GDD, integration of measured actual ET, and root water depletion within the FAO56 model.
- Created GEE code to gather gridMET and OpenET data for the multi-polygon cropland layer in the Eastern Snake Plain Aquifer, providing analysis and insights.

Graduate Research Assistant   Aug 2023-
                                                                   Aug 2024

The Pennsylvania State University, PA

- Developed custom functionality to add K_{cb} climatic adjustments and crop maturity based on GDD.
- Developed Python code for surface runoff integration in the pyfao56 Python package.
- Created a machine learning model to estimate conversion factors between ET_r and ET_o by utilizing location and weather data across a broad spatio-temporal range.
- Developed a Python framework based on the pyfao56 package to simulate SOC impacts across multiple soils, climates, and effective depths of SOC.

Senior Research Fellow   May 2021
Department of Soil Sciences, PAU   – May
                                                                   2022
- Planned and managed field experiments under micro-irrigation systems.
- Developed low-cost, microcontroller-based sensors to observe climate and agricultural parameters for under $50.
- Coordinated with Ph.D. and master's students for research assistance and conducted practical classes for bachelor's degree students.

Master's Research   Aug 2018 –
Department of Soil and Water Engineering, PAU   Apr 2021
- Conducted field experiments for direct-seeded and transplanted rice.
- Collected and analyzed soil moisture data using Delta PR2 probes.
- Estimated and compared groundwater recharge using HYDRUS-1D simulations.

PUBLICATIONS

Published:

Thorp, K. R., DeJonge, K. C., Pokoski, T., **Gulati, D.**, Kukal, M., Farag, F., ... & Holzkaemper, A. (2024). Version 1.3. 0 pyfao56: FAO-56 evapotranspiration in Python. *SoftwareX*, *26*, 101724. https://doi.org/10.1016/j.softx.2024.101724

Singla, P., Sharda, R., Sharma, S., **Gulati, D**., Pandey, K., Navprem, S., ... & Sharma, A. (2023). Variation in physio-chemical attributes and WUE during growth and development of Pak choi (Brassica rapa L. subsp. chinensis L.) under different drip fertigation and mulching treatments. *Acta Alimentaria*, *52*(3), 458-468. https://doi.org/10.1556/066.2023.00084

Gulati, D., Satpute, S., Kaur, S., & Aggarwal, R. (2022). Estimation of potential recharge through direct seeded and transplanted rice fields in semi-arid regions of Punjab using HYDRUS-1D. *Paddy and Water Environment, 1-14.* https://doi.org/10.1007/s10333-021-00876-1

In-preparation:

Gulati, D., & Kukal, M. Assessment of agro-hydrological outcomes for feasible SOC enhancement through conservation practices across soil and aridity spectrum

Gulati, D., & Kukal, M. How does improving soil structure impact crop evapotranspiration and water stress across soil textures and aridity?

Kukal., M & Gulati, D. Climatic and Seasonal Variation in ET_r to ET_o ratios calculated using ASCE standardized Penman-Monteith across the contiguous U.S.

Gulati, D., & Kukal, M. Hydrological losses under increased soil organic carbon and weather variability in different soil textures

PRESENTATIONS

Hydrological losses under increased soil organic carbon and weather variability in different soil textures, Nov 11, 2024 (**ASA, CSSA, SSSA**)

How does improving soil structure impact crop evapotranspiration and water stress across soil textures and aridity? Nov 11, 2024 (**ASA, CSSA, SSSA**)

Climatic and Seasonal Variation in ET_r to ET_o ratios calculated using ASCE standardized Penman-Monteith across the contiguous U.S., July 29, 2024, Anaheim, CA (**ASABE)** [Poster]

Translating soil carbon sequestration into agrohydrological outcomes across a spectrum of aridity and soil texture, July 30, 2024, Anaheim, CA (**ASABE)**

Climatic and Seasonal Variation in ET_r to ET_o ratios calculated using ASCE standardized Penman-Monteith across the contiguous U.S., July 15, 2024, State College, PA (**NABEC)** [Poster]

Translating soil carbon sequestration into agrohydrological outcomes across a spectrum of aridity and soil texture, July 16, 2024, State College, PA (**NABEC)**

HONORS AND AWARDS

- Whiting Water Resources Scholarship ($1,000) in 2024 from the University of Idaho.
- Irrigation E3 learner in 2024 from Irrigation Association.
- Dr. S.D Khepar Gold Medal in 2021 from Punjab Agricultural University.
- Best M.Tech Thesis in Agricultural Engineering in 2022 from ISTE National Award.
- Merit scholarships during Bachelor's and Master's studies from Punjab Agricultural University.

PROFESSIONAL DEVELOPMENT

- Completed a three-day APSIM workshop on crop management simulation at Iowa State University.
- Specialization in Deep Learning by deeplearning.ai on Coursera.
- Machine Learning with Python & Fundamentals of R-programming on Udemy.
- Attended IoT workshop on precision farming by NCPAH, Ministry of Agriculture, India.

TECHNICAL SKILLS

- **Programming:** Python (Data Analysis, Machine Learning, Deep Learning), R.
- **Tools:** HYDRUS, ArcGIS, Google Earth Engine, CROPWAT, APSIM.
- **IoT Development:** Arduino, NodeMCU.
- **Other:** Microsoft Office Suite.