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## EDUCATION

<b>Ph.D. in Water Resources</b> , University of Idaho	2023-Present
<b>GPA:</b> 4.00; <b>Dissertation:</b> <i>Development and deployment of soil water budget models tailored for Idaho agroecosystems and their applications</i>	
<b>Advisor:</b> Dr. Meetpal S. Kukal	
	2018-2021
<b>Master of Technology in Soil and Water Engineering</b> , Punjab Agricultural University, India	
<b>GPA:</b> 3.32; <b>Thesis:</b> <i>Simulation of groundwater recharge from transplanted and direct seeded rice fields</i>	
<b>Advisor:</b> Dr. Sanjay Satpute	
	2014-2018
<b>Bachelor of Technology in Agricultural Engineering</b> , Punjab Agricultural University, India	
<b>GPA:</b> 3.22; <b>Project:</b> <i>Comparative field evaluation of different straw management technologies in combine harvested paddy fields under different straw conditions</i>	
<b>Advisor:</b> Dr. M.K. Narang	

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## RESEARCH EXPERIENCE

<b>Graduate Research Assistant, Department of Soil and Water Systems</b> <i>University of Idaho, ID</i>	Aug 2024-Present
<ul style="list-style-type: none"><li>Developed a Google Earth Engine routine to obtain and analyze OpenET, gridMET, and soils data for the Eastern Snake Plain Aquifer.</li><li>Contributed to pyfao56 Open-Source Evapotranspiration and Water Balance Tool (awarded Irrigation Association's Vanguard Award).</li><li>Contributed to developing a Python model for quantifying evapotranspiration of applied water.</li><li>Assessed soil organic carbon gain impacts on agrohydrological processes across soils, climates, and irrigation practices.</li><li>Built SnakeFlux cooperator portal, a Flask-based web app that automates eddy covariance data delivery and visualization to cooperators. (<a href="https://fieldsync.pythonanywhere.com">fieldsync.pythonanywhere.com</a>)</li><li>Built FAO56-Studio, an interactive no-code web-based platform to simulate FAO56-based soil water budgets. (<a href="https://swb.hydroagrinexus.com">swb.hydroagrinexus.com</a>)</li><li>Analysed eddy covariance energy balance closure and flux footprints using the flux-data-qaqc and fluxfootprints packages.</li></ul>	Aug 2024-Present
<b>Summer Research Assistant-IWRRI</b> <i>University of Idaho, ID</i>	June-August 2025
<ul style="list-style-type: none"><li>Conducted initial hydrological assessment of Portneuf Watershed for IWRRI.</li><li>Analyzed datasets such as gridMET, PRISM, OpenET, USDA CDL, NLCD, IrrMapper from GEE using JavaScript and Python APIs.</li></ul>	June-August 2025
<b>Graduate Research Assistant, Department of Agricultural and Biological Engineering</b> <i>The Pennsylvania State University, PA</i>	Aug 2023-Aug 2024
<ul style="list-style-type: none"><li>Contributed to pyfao56 Open-Source Evapotranspiration and Water Balance Tool</li><li>Developed a machine learning model that enables the usability of NOAA Reference ET forecasts in the Western U.S.</li><li>Assessed soil organic carbon gain impacts on agrohydrological processes across soils, climates, and irrigation practices.</li></ul>	Aug 2023-Aug 2024
<b>Senior Research Fellow, Department of Soil Sciences</b> <i>Punjab Agricultural University, India</i>	May 2021 – May 2022
<ul style="list-style-type: none"><li>Planned and managed field experiments under microirrigation systems.</li><li>Developed low-cost, microcontroller-based sensors to observe climate and agricultural parameters for under \$50.</li></ul>	May 2021 – May 2022

- Coordinated with Ph.D. and master's students for research assistance and conducted practical classes for bachelor's degree students.

**Master's Research, Department of Soil and Water Engineering**  
Punjab Agricultural University, India

Aug 2018 –  
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:

1. Thorp, K. R., **Gulati, D.**, Kukal, M., Ames, R., Pokoski, T., & DeJonge, K. C. (2025). Version 1.4.0 - pyfao56: FAO-56 evapotranspiration in Python. *SoftwareX*, 30, 102109. <https://doi.org/10.1016/j.softx.2025.102109>
2. 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>
3. 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>
4. **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 review:

1. **Gulati, D.**, Kukal, M.S. Increased water retention from soil carbon gain is insufficient to positively impact agrohydrologic outcomes during most years (Under review in *Water Resources Research*).

## PRESENTATIONS

1. Revisiting potato evapotranspiration: Findings from continuous flux measurements in a commercial production field. Jan 21, 2026, Pocatello, ID. (**Idaho Potato Conference**)
2. Increased water retention from soil carbon gain is insufficient to result in a tangible positive change in agricultural water budgets. Nov 11, 2025, SLC, UT. (**CANVAS**)
3. Assimilation of in-situ soil moisture to constrain FAO-56 crop evapotranspiration in water-limited environments. Nov 11, 2025, SLC, UT. (**CANVAS**)
4. Consumptive use & crop yield response to irrigation demand management in Idaho's Magic Valley. Nov 4, 2025, Boise, ID. (**PNW Summit**) [Poster]
5. Increased water retention from soil carbon gain is insufficient to result in a tangible positive change in agricultural water budgets. July 15, 2025, Toronto, Ontario, Canada. (**ASABE/CSABE**)
6. Deploying OpenET to access consumptive use from field to water entity scales across Eastern Snake Plain Aquifer. July 15, 2025, Toronto, Ontario, Canada. (**ASABE/CSABE**)
7. Tracking evapotranspiration of applied water and effective precipitation by color-coding standardized soil water budgets. July 14, 2025, Toronto, Ontario, Canada. (**ASABE/CSABE**)
8. How NRCS conservation practice standards impact agricultural water budgets? March 3, 2025, Boise, ID (**IDEQ IWQW**) [Poster]
9. Hydrological losses under increased soil organic carbon and weather variability in different soil textures, Nov 11, 2024, San Antonio, TX (**ASA, CSSA, SSSA**)
10. How does improving soil structure impact crop evapotranspiration and water stress across soil textures and aridity? Nov 11, 2024, San Antonio, TX (**ASA, CSSA, SSSA**)
11. 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]
12. Translating soil carbon sequestration into agrohydrological outcomes across a spectrum of aridity and soil texture, July 30, 2024, Anaheim, CA (**ASABE**)
13. 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]
14. Translating soil carbon sequestration into agrohydrological outcomes across a spectrum of aridity and soil texture, July 16, 2024, State College, PA (**NABEC**)

## **RESEARCH PROPOSALS**

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1. Understanding consumptive use on the ESPA: Data gaps, uncertainty, and impacts, PI: Meetpal Kukal, 2025 Idaho Water Research Priorities, IWRRI (\$44,870); Role: Key personnel.
  2. Hydrologic modelling and data provisioning for development of a dairy water footprint tool for the Western U.S., PI: Meetpal Kukal, Dairy Management Inc. (\$86,875); Role: Key personnel.
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## **HONORS AND AWARDS**

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- Vanguard award to pyfao56 in 2025 from Irrigation Association
  - Joseph Jordan Student Research Fellowship (\$3500) in 2025 from IWRRI
  - 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
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## **PROFESSIONAL DEVELOPMENT**

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- 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