



SCHOOL OF
**BIOSYSTEMS AND
AGRICULTURAL ENGINEERING**
College of Engineering, Architecture and Technology

AG. HALL 314 | FRIDAY, MAY 2, 2-3PM

Developing a Crop Evapotranspiration Forecast Tool for Global Use

MAMATA PANDEY

ABSTRACT | Crop evapotranspiration (ET) is essential for agricultural water management, as it helps in determining the crop water needs. This study aims to develop a crop ET forecast tool based on the FAO 56 Penman Monteith method by combining weather forecast data and crop information provided by users through the Canopeo app. To obtain global weather forecast data, we use OpenMeteo web services. To estimate single crop coefficient (Kc), we use crop information such as crop type, plant date, and approximate crop height. We combine the Kc and reference evapotranspiration (ET_o) forecast to get the crop ET. We have implemented the mechanism in the Amazon Web Service (AWS) Cloud platform. The result of the study will aid in making the crop ET forecast tool easily accessible to agricultural producers.

BIO | Mamata Pandey is a graduate student pursuing a master's degree in Biosystems Engineering. She completed her bachelor's degree in civil engineering from Nepal. She is currently working under the guidance of Dr. Jeff Sadler on developing a tool to forecast crop evapotranspiration on a global scale. Her research interest lies in exploring methods for optimizing water use, aiming to develop sustainable solutions for effective water management.



Evaluation of Low Value Lipids for Thermal Storage Applications

NAZLIM AKTAY

ABSTRACT | C Efficient thermal energy storage (TES) is crucial for intermittent solar and wind energy, with phase change materials (PCMs) playing a key role. This study explored animal fats (pork, goat, lamb, beef) and crude sunflower oil wax as alternatives to refined, petroleum based PCMs (stearic, palmitic, lauric acids, paraffin, soy/sunflower waxes). Additionally, eastern red cedar wood, an underutilized, locally available and low-cost material, was investigated as a potential carbon source for lipid shape stabilization. Results showed low-value lipids exhibit suitable phase change temperatures, thermal stability, and moderate activation energy, making them promising for low-temperature solar, building/electronic, and on-farm applications.

BIO | I am graduate research assistant in Biosystems and Agricultural Engineering at Oklahoma State University, pursuing an MSc with expected completion in May 2025. I hold a BSc in Chemical Engineering from Ege University, Izmir, Turkey. My master's research focuses on exploring the viability of low-value lipids as phase change materials.



Evaluation of Five Data-Driven Approaches for Estimating Canopy Temperature in Irrigated Cotton

PALASH KUMAR KUNDU

ABSTRACT | Canopy temperature (CT) is a key indicator of plant water stress, but traditional CT-based irrigation scheduling faces challenges, such as high sensor costs and complex data interpretation. This study evaluates machine learning models Linear Regression, Random Forest, XGBoost, LightGBM, and LSTM for CT prediction using in-situ data from infrared thermometers and meteorological parameters from the Oklahoma Mesonet. The models will be tested at different times of the day to address CT biases. Model accuracy will be assessed using various statistical indicators. The findings aim to optimize irrigation scheduling and water use efficiency.

BIO | I am Palash Kumar Kundu and I am working as a Graduate Research Assistant in the department of Biosystems and Agricultural Engineering at Oklahoma State University in Stillwater. I have completed my BSc in Agricultural Engineering and MS in Irrigation and Water Management from Bangladesh Agricultural University, Mymensingh.

