

TEMPERATURE INDICATORS FOR DEVELOPING ADAPTION STRATEGIES FOR CROP PRODUCTION: A CASE STUDY IN FLORIDA

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As the world's population continues to grow, there are increased demands on food. Changes in regional climate patterns can disrupt weather and affect crop production. In this study different ecological indicators are used to study the different crops i.e. crop failure temperature and frost indices, beyond which plants and plant tissue have a high potential of being damaged. The historical (1950-2005) and future climate scenario (Representative concentration Pathways 8.5, 2006-2021) data from Coupled Model Inter-comparison Project Phase 5 (CMIP5) 21 global climate models are used for the analysis. The frequency and intensity trends for CFTs are analyzed at six temperature thresholds ($T_{max} \geq 30^{\circ}\text{C}$, 32°C , 34°C , 35°C , 39°C , and 40°C) as well for frost, six thresholds ($T_{min} \leq -5^{\circ}\text{C}$, -2°C , -1°C , 0°C , 2.2°C , 5.6°C).

From this study, it is observed that there will be an increase in the intensity and frequency trends of crop failure temperature (0.01 to 0.03°C per decade) by 2100. Furthermore, frost analysis reveals that the intensity and frequency trends are only at higher temperature thresholds (more than 0°C) for the Florida (Panhandle) region. The direct effects of these indicators are reduced cropland, increased wildfire occurrence, reduced water availability, increased plant failure and water demand. Adaptations must be followed that helps to enhance agricultural productivity under the climate change scenario to ensure food security. Therefore, using a conceptual framework i.e., Driver-Pressure-State-Impact-Responses (DPSIR) framework, adaptation strategies are recommended for decision making so that stakeholders and managers can use them to draw responses for their use.

PRESENTER BIO: Anjali Sharma is a Ph.D. candidate at Florida A&M University majoring in the School of the environment. Her research interest lies in the climate resilience, its impact on the agro-ecosystems and food security as well as developing decision support tools. She is currently working with Dr. Aavudai Anandhi Swamy in Biological System Engineering.