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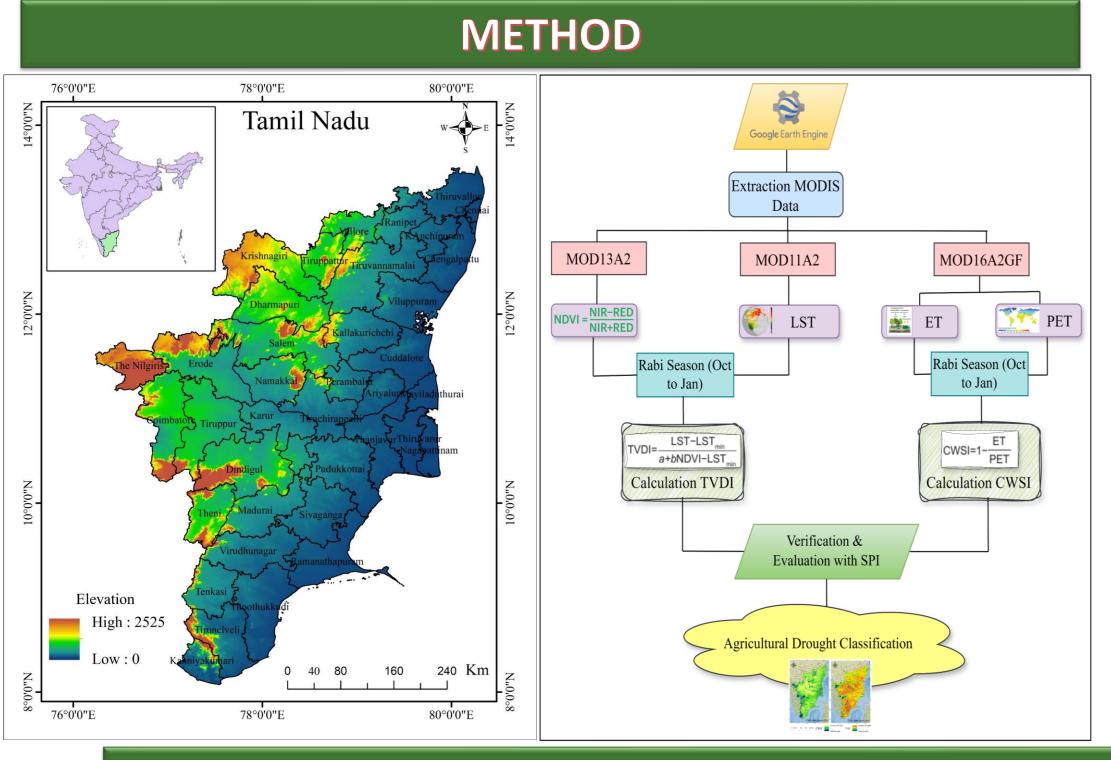
## Integrating Vegetation and Thermal Indices for Agricultural Drought Monitoring using Google Earth Engine: A Study from the Semi-Arid region of South India

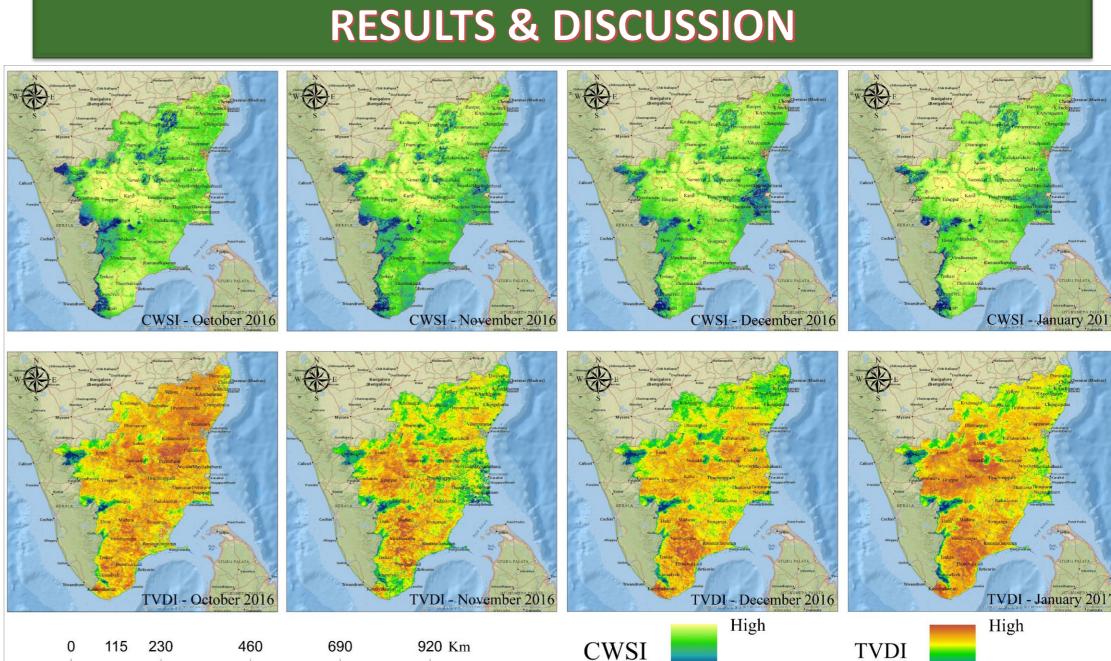
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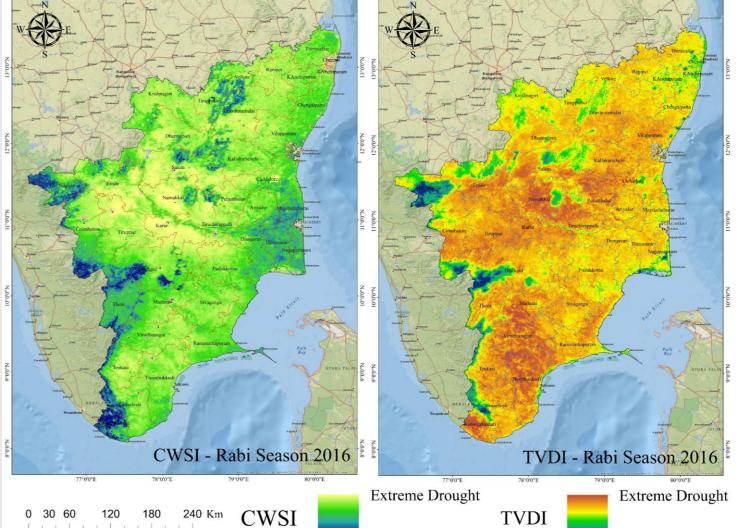
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### **INTRODUCTION & AIM** Precipitation Deficit Evapotranspiration moisture due to low rainfall accelerates with Drought Land Management Agriculture Hydrology practices degrade soil and reduce increases temperatures, intensifies evapotranspiration water availability 650,000 people died <sup>1</sup>/<sub>4</sub><sup>th</sup> of children will live in areas with 2.3 billion people facing water stress 1970 2000 2019 2022 >75% of the world's population may face frequent 700 million people will be at risk of being displaced Frequency and Duration has risen 29% /egetation Health Assessing plant vitality through spectral analysis. Soil Moisture Measuring water content in Remote Sensing and Surface Temperature Determining surface heat as Source: Stephen, 2012 Objectives of the Study

- > To evaluate and compare the performance of two remote sensing based drought indicators over Tamil Nadu during the Rabi season.
- > To explore the spatial and temporal dynamics of TVDI and CWSI across the **Rabi season** to understand drought variation.
- > To demonstrate the potential of integrating vegetation and thermalbased indices for enhanced and robust agricultural drought monitoring in semi-arid regions.







Mild Drought

characterized by high values for both indices during the Rabi season of 2016. Tenkasi, Tirunelveli, Virudhunagar, Tiruchirappalli, Tiruppur, Karur, Erode, Namakkal, Perambalur, Villupuram, and Salem districts experienced extremely dry conditions.

results

some

indicated

agricultural drought in Tamil

Nadu was overall relatively

severe to extreme, and

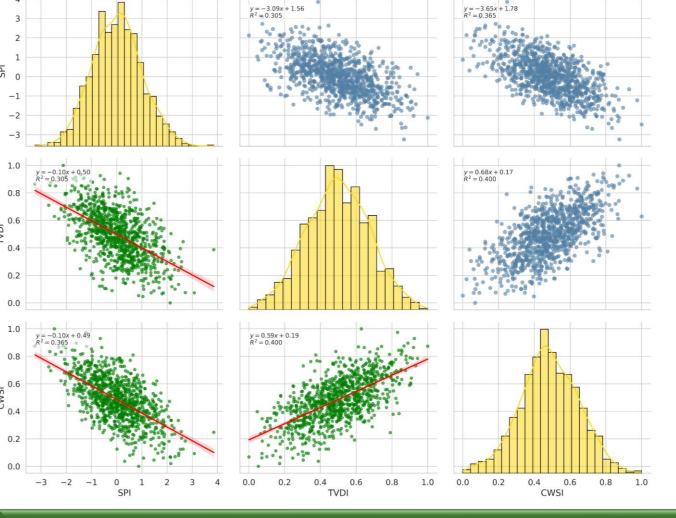
drought was especially severe

strip

areas,

The high CWSI and TVDI values may be attributed to irregular rainfall, limited groundwater availability, and a low percentage of irrigated farmland, indicating greater crop water stress in those areas.

A strong positive correlation is evident between CWSI and **TVDI** ( $R^2 = 0.40$ ), indicating that both indices effectively capture drought severity. However, CWSI = 0.365) shows **slightly** better alignment with precipitation-based drought (SPI).



## **CONCLUSION and SUGGESTIONS**

Mild Drought

This study demonstrates that both TVDI and CWSI effectively capture the spatial and temporal dynamics of agricultural drought in Tamil Nadu during the Rabi season. A strong correlation between the two indices indicates consistent drought detection, with CWSI showing slightly higher sensitivity to crop water stress. Overall, integrating vegetation and thermal indices enhances the accuracy and robustness of drought monitoring in semi-arid regions. However, this study used only one year of data from Tamil Nadu in the analysis. In the future, the study will be conducted on a longer time series.

## **REFERENCES**

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- Ma, Z.-C., Sun, P., Zhang, Q., Hu, Y.-Q., & Jiang, W. (2021). Characterization and Evaluation of MODIS-Derived Crop Water Stress Index (CWSI) for Monitoring Drought from 2001 to 2017 over Inner Mongolia. Sustainability, 13(2), 916. https://doi.org/10.3390/su13020916