

ABSTRACT

Climate change in Indonesia has caused various negative impacts, one of which is on the agricultural sector such as sugarcane. One significant impact is drought, which can disrupt land productivity. The lack of accuracy in predicting drought risk makes it difficult to make mitigation and adaptation decisions. Manual drought monitoring is time-consuming and costly, and is less responsive to changes in field conditions. On the other hand, satellite data has a wide area coverage and high acquisition frequency. However, its utilization has not been maximized, especially in the application of machine learning techniques to produce accurate drought prediction models. This condition shows a gap between the potential of satellite data and effective current analysis methods. As a solution to handle the impact of drought due to extreme weather, this research develops a drought prediction model using Landsat 8 imagery and Random Forest algorithm. The model is based on Vegetation Health Index (VHI). The system is able to classify five levels of drought, namely no, mild, moderate, strong and extreme. The best model was obtained in the configuration of 100 decision trees with 90% accuracy and a Kappa value of 0.88. This approach demonstrates the effectiveness of combining satellite data and machine learning in drought mapping, and makes a real contribution to supporting agricultural adaptation strategies.

Keywords: *Sugarcane, Drought Mapping, Landsat 8 Imagery, Random Forest, VHI*