

## **ABSTRACT**

Rainfall is a significant natural phenomenon that impacts various sectors of life especially in tropical countries like Indonesia. Rainfall prediction is essential to support planning in agriculture, environmental management, and disaster mitigation. The random forest algorithm is widely used in weather data classification due to its ability to handle complex data. Challenges occur when the data is imbalanced, meaning that the number of instances in each class differs significantly. This condition causes the model to be biased toward the majority class. Data balancing methods such as Synthetic Minority Oversampling Technique (SMOTE) and Adaptive Synthetic Sampling Approach (ADASYN) are used to overcome this issue. This study aims to determine the effect of applying SMOTE and ADASYN on the performance of the random forest algorithm in classifying rainfall data in Bandung City. Evaluation was carried out using accuracy, precision, recall, and F1-score metrics. The results show that the random forest model without balancing achieved an accuracy of only 70,3%, whereas after applying SMOTE and ADASYN the accuracy increased to 84% and 79%, respectively. Precision, recall, and F1-score values also improved significantly. Based on these findings, it can be concluded that SMOTE is more effective than ADASYN in improving the classification performance of imbalanced rainfall data.

**Keywords:** Rainfall, Random Forest, Imbalanced Data, SMOTE, ADASYN