

*Information System for Natural Resource Mapping and Harvest Prediction Using
Random Forest (Case Study: Department of Communication and Digital of
Bondowoso Regency)*

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ABSTRACT

Bondowoso Regency possesses abundant agricultural potential, yet current commodity data management remains manual and scattered in raw tabular formats, hindering stakeholders in monitoring and strategic decision-making. This research aims to develop a WebGIS-based information system named PANDAWA to visualize natural resource potential spatially and implement the Random Forest algorithm to predict harvest yields for rice, corn, and tobacco commodities. The research method involves collecting historical data over 13 years (2012–2025), encompassing harvest area variables and agro-climatic factors such as rainfall and humidity, with system development utilizing React and Next.js technologies. Performance testing results demonstrate high accuracy levels, evidenced by R^2 values of 0.9856 for rice, 0.9648 for corn, and 0.8787 for tobacco, along with User Acceptance Test (UAT) results receiving a "Strongly Agree" response from users. In conclusion, the system proves effective in presenting interactive land zoning information and providing precise harvest estimates, making it feasible for implementation as a supporting instrument for food security and agricultural trade policies in Bondowoso Regency.

Keywords: Geographic Information System, Random Forest, Harvest Prediction, Agriculture, Bondowoso.