

ABSTRACT

Jombang Regency is one of the main rice production centers in East Java and plays a crucial role in supporting regional food security. However, challenges such as land-use conversion, population growth, and limited utilization of agricultural machinery (alsintan) may disrupt long-term rice availability. This study aimed to develop a system dynamics model to analyze the key factors affecting rice availability and formulate policy scenarios to maintain sustainable food security in Jombang Regency. The model was developed using Vensim software and validated using historical data from 2014 to 2024. Four policy scenarios were tested: Business As Usual (BAU), increased use of alsintan, land conversion control, and a combined scenario. The simulation results show that the combined scenario yields the highest rice availability, reaching 557,777 tons by 2035. The model output was visualized through an interactive dashboard using Google Looker Studio, which allowed users to dynamically explore the simulation results. This dashboard serves as a decision-support tool that enables data-driven policymaking for adaptive and sustainable regional economic development.

Keywords: *Dynamic System, Rice Availability, Food Security, Policy Scenarios, Jombang Regency.*