ARIMA, TRANSFER FUNCTION AND ADAPTIVE NEURO FUZZY INFERENCE SYSTEM FOR FORECASTING RICE PRODUCTION

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ABSTRACT

Food crop production forecast figure is needed for supporting government on the handling of the issue of food problem especially rice in Indonesia. Rice production forecast figure has been regularly conducted by Badan Pusat Statistik (BPS), Statistics Indonesia, using indirect forecasting technique, i.e. forecasting the rice production through forecasting the harvested area and the rice productivity. The objective of this research is to develop the best model for forecasting the rice production based on the Adaptive Neuro Fuzzy Inference System (ANFIS) approach. The result will be compared to the forecasting results published by BPS and two other classical methods, namely ARIMA and transfer function model. Data about wetland rice in Central Java, South Kalimantan and North Sumatera Province from 1st subround 1983 to 3rd subround 2010 are used as case study. The accuracy performance for each forecasting method is measured by Mean Absolute Percentage Error (MAPE) criteria. The results show that from all of the listed method used in this research, the best forecasting method for harvested area of wetland rice in Central Java Province is ANFIS method with MAPE value 6.89% and the best forecasting method for rice productivity is ARIMA with MAPE value 1.83%. In South Kalimantan, ARIMA is the best forecasting method for both of harvested area and productivity of wetland rice with each MAPE value 9.96% and 5.18%. In North Sumatera Province, the best forecasting method for harvested area of wetland rice is transfer function with MAPE value 2.43% and the best forecasting method for rice productivity is ANFIS with MAPE value 1.82%.

Keywords: Rice Production, ANFIS, ARIMA, Transfer Function