ABSTRACT

SUWARTO. Growth and Yield Model of Maize Intercropped with Cassava (Supervised by Sudirman Yahya, Handoko, and M.A. Chozin).

This research consists of crop modeling that involves field experiment to construct a model of growth and yield of maize intercropped with cassava. The objective of the field experiment was to understand the process mechanism of competition between maize and cassava, to generate the parameters of plant growth and development and their values, and to validate the model. Field experiment of growing maize (Arjuna, Pioneer 4, and Cargill 9 in various planting densities) and cassava (Adira 1) was conducted for monoculture and intercropped plants. Intercropped cassava increased intraspecific competition of maize. Yield of maize decreased at about 3 to 14%. Maize also reduced growth and yield of cassava. Taller canopy of later maize variety and higher density caused heavier competition for cassava. At highest density of maize (80,000 plants ha⁻¹), intercropped with Arjuna, Pioneer 4, and Cargill 9 decreased yield of cassava tuber of about 40.6%, 43.0%, and 64.3% respectively. However, the intercropping still gave a better land productivity, where land equivalent ratio (LER) was larger than 1.0. The LER of intercropping with Arjuna, Pioneer 4, and Cargill 9 were 1.51, 1.73, and 149, respectively. Model being constructed can be used to simulate growth and yield of maize and cassava in intercropping system, where the light and soil moisture are the limiting factors. Validation of the model for total and grain or tuber dry weight variables result in 95% of variables are not significantly different with the observed values from the field experiment. However, using all variables, 80% of the model outputs are not significantly different with the observed values. Those prove that the model has been able to describe the behaviour of growth and yield of both crops in the intercropping system and therefore, it can be applied for the purpose of prediction. The model still needs to be validated for different time of planting, planting arrangement, and densities, plant growth factors for both crops, for wider application of the model.