ABSTRACT

WATER BALANCE ANALYSIS OF SOYBEAN (Glycine max [L] Merrill) CULTIVATION ON DRY LAND

By

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Soybean is one important food crop in Indonesia after rice and corn. In 2008 to 2010, the amount of soybean harvest has increased and decreased. One effort to increase the soybean harvest is expansion programs to exploit dry lands. However, water scarcity is the main problem faced in dry land cultivation. For this reason, study on optimization of water use become very important.

This study aimed to (1) calculate the amount of soybean crop water requirements (ETc), (2) analyze the potential evapotranspiration to determine the crop coefficient Kc, (3) analyze the relationship between rainfall and surface runoff, (4) analyze the relationship between rainfall and percolation, and (5) to calculate the water productivity.

The experiment was conducted at the Integrated Field Laboratory College of Agriculture, University of Lampung from 15 October 2011 to 6 January 2012. The observations were carried out on two groups of experimental plots with plastic liner (plot A) and without plastic liner (plot B), each consisting 4 plots. Each plot was equipped with a water storage pond at the downstream.

The results showed that (1) the averages of ETc were 4.24 mm/day for initial growth, 4.80 mm/day for development, 6.08 mm/day for mid season, 5.51 mm/day for end season, and total ETc during the planting period was 473.80 mm, (2) the values of Kc were 0.98 for initial growth, 1.12 for development, 1.26 for mid season, and 1.11 for end season. (3) The minimum rainfall producing runoff was 0.3 mm/day. (4) The minimum rainfall producing percolation was 0.42 mm/day, (5) the water productivity on plot A was 0.24 kg/m3 while on the plot B was 0.37 kg/m3.

Keywords: evapotranspiration, percolation, soybean, surface runoff, water balance