

SUMMARY

Dipta Pramana Suprobo, Department of Water Resources Engineering, Faculty of Engineering, University of Brawijaya, November 2016, Optimization Study of Cropping Pattern for Maximizing the Benefit of Agriculture Production in Irrigated Area of Jati Ampuh. Academic Supervisor : Lily Montarcih Limantara and Rini Wahyu Sayekti.

Indonesia is an agricultural country that utilizes a majority of water resources for irrigation purposes. The availability of the discharge water for irrigation is influenced by the season. During the dry season, the amount of water available for irrigation is decreased, otherwise the amount of water to be increased in the rainy season. Irrigation water supply is planned based on availability of water to use as a reference for the preparation of the planting layout plan. To determine the condition of water availability required water balance analysis to determine whether the water supply has a condition of excess (surplus) or shortage (deficit).

In the research of this study, using optimization techniques to optimize the availability of irrigation water to resulting in agricultural production and the maximum benefit and utilization of irrigation is more effective and efficient. In the irrigated area of Jati Ampuh has occurred of water capacities shortage on the application of the existing cropping pattern. Water shortages occurs at the beginning of the planting in November period I to December period II and June period III. Therefore, things that can be done is to postpone the starts of cropping pattern into December period II. Moreover, perform optimization using 5 alternative of cropping pattern. Form of cropping pattern alternative I, cultivating season I : Rice-Cane, cultivating season II : Rice-Corn-Cane, cultivating season III : Rice-Corn-Cane. Form of cropping pattern alternative II, cultivating season I : Rice-Corn-Cane, cultivating season II : Rice-Cane, cultivating season III : Corn-Cane. Form of cropping pattern alternative III, cultivating season I : Rice -Cane, cultivating season II : Rice-Cane, cultivating season III : Rice-Cane. Form of cropping pattern alternative IV, cultivating season I : Corn -Cane, cultivating season II : Rice-Cane, cultivating season III : Corn-Cane. Form of cropping pattern alternative V, cultivating season I : Rice-Corn -Cane, cultivating season II : Rice-Cane, cultivating season III : Rice-Cane. Land area of the irrigation is 497 Ha. Same with irrigation area of Jati Ampuh. In the analysis of this study, the availability of irrigation water using dependable discharge (Q dependable of 80%).

From the results of the optimization using solver program, then the most optimum of cropped intensity is alternative II and alternative IV with intensity cropping in amount 271,76%. The most optimum of agricultural profits is alternative V with profit in amount Rp 15,593,316,933.00. The best alternative of cropping pattern are valued by intensity cropping and agricultural profits. To determine the best alternative cropping pattern, be giving a score to each alternative of cropping pattern. From giving that score, then selected cropping pattern with the highest score. Cropping pattern with the highest score on application of the alternative II cropping pattern. Configuration of the alternative II cropping pattern is cultivating season I : Rice-Corn-Cane, cultivating season II, Rice-Cane, cultivating season III : Corn-Cane. Configuration details of the land area is, cultivating season I : Rice 345,503 Ha – Corn 125,497 Ha- Cane 26 Ha, cultivating season II : Rice 471 Ha-Cane 26 Ha, cultivating season III : corn 330,672 Ha-Cane 26 Ha. Percentage of cropped intensity for a year in amount 271,76% and profit in amount Rp 15.495.380.341,00

Key Words : irrigation, water balance, Optimization, cropping land, agriculture profit