SUMMARY

RINDA WIRA RISMA. 105040201111136. Land Suitability Evaluation for Sugarcane *(Saccharum officinarum L.)* in Dry Land Rembang Plain based on Geographic Information System. Supervised by (1) Prof. Dr. Ir. Soemarno, MS (2) Sativandi Riza, SP. M.Sc dan (3) Ir. Fitriningdyah Tri Kadarwati, MS.

Target of national self-sufficiency of sugar on 2014 is still constrained social and ecological problems. Social problems caused by the increasing demand for sugar. Ecological problems that occur due to a decrease in land resources which impact low production and yield of sugarcane. Efforts to improve the quality of sugarcane planting can be done by improving the quality of land. Improvement of the quality of the land can be done by observing the characteristics of the land and find a limiting factor. This can be done by evaluating the suitability of land for sugarcane. Land evaluation is a process of estimating the potential of land resources for landuses. Sugarcane land development-oriented focus on dry land. Rembang district is an area of Central Java sugarcane production centers which have the characteristics dominated by dry land. According to Disbun Rembang in 2012 generally sugarcane production in dry land ranged between 50-70 tonnes/ ha. Characteristics of dry land is limited about low water availability and high diversity of geological characteristics. Geographic information system is mapping and spatial analysis system integrated the characteristics of land quality and the sugarcane requirement. Marwoto (2007) mentions land suitability maps in GIS format can be used as a tool decision support system for the spatial planning and management of sustainable land resources. The purpose of this study was to (1) determine the land suitability class and limiting factor in all land unit map for cane, (2) search for land characteristics affecting sugarcane production in all land unit map for cane, and (3) make recommendations to the management of the land unit map for sugarcane.

Land resource inventory methods such as soil characteristics measurement using a survey method. Land suitability evaluation was matched the characteristics of land quality and the sugarcane requirement based on the principle of minimum liebig law. Spatial overlay method used to created land suitability dry land rembang plain maps. While the method to analysed factors affecting sugarcane production used quantitative analysis of pathways method.

The results of the study include:

1. The actual land suitability classes which include marginally suitable (S3) and not suitable (N), with an area of 24.846 ha and 28.623 ha. Marginally suitable (S3) class consists of 5 land suitability sub-class includes S3 rc, nr; S3 oa, rc, nr; S3 wa, nr; S3 wa, oa, nr; and S3 oa, nr. The low availability of water and nutrients increasingly dominant limiting factor not suitable of sugarcane land suitability classes in dry land Rembang plains. Semi-intensive farming (the management of low to moderate) increase land suitability class to be moderately suitable (S2) covering an area of 2.560 ha and the marginally suitable (S3) covering an area of 32.514 ha. Intensive agriculture (higher management) increasing land suitability classes to be highly suitable (S1) covering an area of 53.470 ha.

2. Based on general path model can conclude about land characteristics topsoil clay, CEC, pH, organic C, N, P, K, KHJ, and average rainfall affect the sugarcane production of 88,15%. Rainfall characteristic was most influenting sugarcane production of 72%. Main path model ($\rho = 0,049$) reflects production indirectly influenced by the availability of water (low rainfall) through topsoil clay content, CEC, available K, and N total as an intervening variable.

3. Recommendations high level management (intensive agriculture) consists of the selection of sugarcane varieties based on varieties recommendations map, management irrigation during deficit month based on the sugarcane water requirement, the application of organic matter from sugar factory litter, management of drainage channel/ juringan more deep, especially during the rainy season and adding inorganic fertilizer with high nutrient concentration. The intensive farming systems increase sugarcane land suitability class to be highly suitable (S1), with potential production range 80-100%.