

Land Suitability and Dynamic System Model for Land Use Planning of Paddy Field in Indramayu Regency, Indonesia

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Key words: Land management; Remote sensing; Spatial planning; rice; spatial priority; paddy field protection; land evaluation

SUMMARY

Indonesia is fourth most populated country in the world after China, India and the USA with estimated population at more than 255 million in 2015. Rice is the staple food for more than 90% of Indonesian population. With the rice consumption rate at 98.57 kg.capita-1.year-1, the dependence of Indonesia on rice is very high, and so this explain the importance of maintaining paddy field land utilization. One of the problem for Indonesia is the fact that actual rice concentration production from paddy field was in Java Island. Even though, Java Island is the most populated Island in Indonesia, making a high pressing on paddy field to be converted to become other land utilization such as settlements and industry. This high paddy field conversion give an impact on declining the food security of the country. For this reason, maintaining the sustainable paddy field is very important. This study was done in Indramayu Regency, one of the center of rice production in Java Island as a case study. The objectives of this research were: (i) to identify the land suitability for paddy field, including its limiting factors, (ii) to modelize the rice production and consumption in the socio-economic context of the region, and (iii) to plan the spatial priority area of paddy field protection according to land suitability and model prediction. A land evaluation steps for paddy was done using the data of soil survey, while SPOT-6 imagery was used to delineate paddy fields. Dynamic system model of rice production and consumption is built using Powersim software. Based on the model built and land suitability, the land area of paddy field to be protected is is delineated in order to maintaining rice self sufficiency of the region untill next 2040. The research results showed that land suitability class for paddy fields in research area ranged from highly suitable (S1) to marginally suitable (S3). Several land characteristics were discovered as limiting factors, i.e. nutrient retention and nutrient availability. The model predicts that with the current situation, the ability of the region to export rice would decrease by 10-15% in the next 20 years. By combining model prediction with land suitability, priority areas of paddy field protection were delineated. Policy recommendation were also compiled in term of maintaining paddy field area as well as food self-sufficiency of the region.

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