Thesis Title	New Integrated Cropping Models for Existing Ecology of Rajburi Province by using Multi-criteria Decision Making (MCDM)
Thesis Credits	12
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Degree of Study	Master of Science
Department	Natural Resource Management
Academic Year	2000

Abstract

This study is carried out to investigate cropping models for existing ecology in Rajburi Province. Multi-criteria Decision Making (MCDM) is used for presenting the agricultural alternative to the farmers. The study is divided into 2 parts. The first part, is analyzing the physical and social characteristics of the study area and farmer, respectively, including agricultural commodity productivity, using ARC/VIEW version 3.1. The physical agriculture area of 1,471,140 rai, is covered with 17 groups of the soil type. The characteristic of most of the soil in Rajburi is sandy loam texture, medium organic matter, low soil fertility, and high water drainage. In addition, the irrigation system covers 57.87 % of the agricultural area and 2.65% is high risk to flooding. About 16% of the land is under drought. The results also show that the highest population density is in Damnernsaduak District whereas most of the agricultural land is used for single cropping system. However, 36.19% of the total farmers grow paddy rice and 11.72 % grow sugarcane. 86.57% of the farmers accustom to using the chemical fertilizer and 73.67 % are favorite in using the chemical pesticide.

The second part of the study is analyzing the type of the planting crops and the suitable new integrated cropping models for Rajburi using multi-criteria decision making (MCDM) including physical, biological, socio-economic, farmer's need, physiological and soil characteristic factors. The type of the suitable crops is divided into 5 groups: paddy rice, field crops, fruit crops, vegetables, and floriculture crops. It is found that the highly suitable commodities of the field crops are sugarcane and maize. In addition, the highly suitable crops of the fruits are mango, guava, young coconut, jujube, and pomelo. Furthermore, the highly

suitable vegetables are baby corn, yard long bean, snake eggplant, white-ball eggplant, Chinese bitter gourd, Chinese cabbage, and morning glory or water spinach. All floriculture and rice are considered as the moderate suitable crops for Rajburi. On the other hand, the results of the suitable cropping models is analyzed by using the highly suitable crops incorporated with soil, marketing demand, climatic demand, cultural practice, productive efficiency factors. All of the highly suitable cropping models are considering as the new integrated models, if it contains paddy rice in the models. The results show that there are 3 groups of the new integrated cropping models. Firstly, the cropping models consist of 4 main crops, which are rice, field crop, fruit crops and vegetable. The highly suitable models in this group are rice-sugarcane-mango-baby corn, rice-sugarcane-mango-yard long bean, rice-sugarcane-mango-snake eggplant, rice-sugarcane-mango-white-ball eggplant, rice-sugarcane-mango-Chinese bitter gourd, rice-sugarcane-mango-Chinese cabbage, rice-sugarcane-mango-morning glory, rice-sugarcane-young coconut-baby corn, rice-sugarcane-young coconut-Chinese cabbage, rice-sugarcane-young coconut-morning glory, rice-sugarcane-pomelo-baby corn, rice-sugarcane-pomelo-Chinese cabbage, rice-sugarcane-pomelo-morning glory, rice-corn-mango-baby corn, rice-corn-mango-yard long bean, rice-corn-mango-snake eggplant, rice-corn-mango-white-ball eggplant, , rice-corn-mango-Chinese bitter gourd, rice-corn-mango-Chinese cabbage, and rice-corn-mango-morning glory. Secondly, the highly suitable cropping models consist of 3 sectors of rice or field crops and 1 sector of fruit crop, are rice-rice-rice-mango, rice-rice-sugarcane-mango, rice-rice-corn-mango, rice-sugarcane-sugarcane-mango, and rice-sugarcane-corn-mango. Finally, the highly suitable cropping models consist of 1 sector of rice or filed crop and 3 sectors of fruit crops, are rice-mango-mango-mango, rice-mango-mango-guava, rice-mango-mango-young coconut, rice-mango-mango-jujube, and rice-mango-mango-pomelo.

Keywords: Multi-criteria decision making (MCDM) / New integrated cropping model / Rajburi