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PADDY PRODUCTION PLANNING IN KELANTAN USING
MIXED INTEGER PROGRAMMING

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ABSTRACT

Lembaga Kemajuan Pertanian Kemubu (KADA) is one of the agricultural industries located in Kelantan that works on improving various crop advancement includes paddy cultivation. Since there is a large market for paddy production in Malaysia, the paddy producers frequently encountered by the issue of being unable to meet the demand of paddy in a profitable way due to the ongoing rise in input prices such as labor, land rent, and agricultural inputs. This paper proposes an application of Mixed Integer Linear Programming (MILP) to manage the paddy production planning in order to minimize cost of paddy production and maximize net profit of paddy production. The Mixed Integer Linear Programming (MILP) method is applied because there are constraints that need to be fulfilled on the problems. The mathematical model was developed to determine the minimum cost of paddy production and to obtain the optimal solution of maximize profit. The cost of raw materials, labours, machines, land rents, and the amount of paddy product sold (tonnes) were critically considered in this mathematical modelling. The result from the proposed model for the minimize cost model is RM6,532,648.76 while the maximize profit model is RM12,340,600.00. The findings indicate the proposed model could incorporate the essential resources which result in reducing the total manufacturing production cost at the same time maximize the profit.

1 INTRODUCTION

1.1 Research Background

Rice is the world's top grain that has always been a good source of energy as it is rich in many nutrients, carbohydrates, calories and protein, Sánchez et al. (2018). Paddy cultivation is implemented in warm climates which refers to a condition that is neither very cold nor very hot. Staple food of the majority for countries in Asia is paddy as stated by Firdaus et al. (2020). According to them, the result is seen as an essential product that provides political stability and economic expansion for many nations in the region. Similarly, paddy and rice have been a primary emphasis of Malaysia's self-sufficiency strategy. The Government of Malaysia considers food security to be nearly identical with rice security which makes the crop production self-sufficiency as a national policy objective as reported by Omar et al. (2019). Malaysia has a net of 7.839million hectares of farmland, with paddy plantation at 8.5percent(671,679ha) and since it is an important component of Malaysian cooking, the average rice intake in Malaysia is approximately 82.3kilospereyear as attested by Shamshiri et al. (2018). According to Shamshiri et al. (2018), the population growth has affected the rice yield and quality to arise more and more lofty demand on an everyday basis. Therefore, in order to produce a maximum paddy yield with a minimum production cost, more user-friendly and environmentally friendly contemporary technology are needed in many fields of paddy production agriculture while applying the mechanization and automation to preserve production competitiveness.

The agriculture community, particularly the rice producers in Malaysia is being confronted with numerous serious issues for instance the youth emigration that has been a critical concern for the rice farming sector. This is due to the fact that youth's superiority which generally refers to the production, age, and education, these occurrences have a detrimental impact in that they make technology transfer challenging, endanger production levels, and expose agriculturists to