PERFORMANCE EVALUATION OF A POWER TILLER FOR SOIL TILLAGE OPERATION ON VARIOUS SOIL MOISTURE CONTENTS OF DRY PADDY FIELD: A CASE STUDY

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TABLE OF CONTENTS

ABSTRACT

PERFORMANCE EVALUATION OF A POWER TILLER FOR SOIL TILLAGE OPERATION ON VARIOUS SOIL MOISTURE CONTENTS OF DRY PADDY FIELD: A CASE STUDY

Land preparation is a significant practice in rice cultivation. The creation of commodious machinery especially power tiller for land preparation proved that it can improve ploughing quality and increased grain yield, but not only that, it is also reduces elapsed time and the costs of land preparation. The study was conducted to test the relationship between soil moisture versus ploughing depth, speed versus ploughing depth, and effective field capacity (EFC) versus fuel consumption using power tiller that is Two-Wheel Tractor (2WT) (Model S120). The data are collected such as percentage of soil moisture in the morning, afternoon and evening, time taken by machine during ploughing operation, total time including turning time, fuel consumption, ploughing depth. Replication was made 6 times in different plot and different soil moisture. Replication was made 2 times in the morning, 2 times in the afternoon and 2 times in the evening. The results show that the soil moisture 11.38% in the morning, 8.33% in the afternoon and 6.53% in the evening. Higher the soil moisture will increase the average of ploughing depth. This study shows that the average speed of power tiller during ploughing operation are 1.0122, 1.0519, 1.088, 1.1102, 1.1285 and 1.1329 km/hr respectively. The mean of ploughing depth for 30 random sample taken from each plot is 7.97 and 7.85cm (morning), 6.83 and 6.62cm (afternoon), 6.42 and 6.11 cm (evening). The effective field capacity for each plot is 0.047, 0.048, 0.048, 0.049, 0.050 and 0.050 ha/hr respectively. The fuel consumption recorded is 1.349, 1.386, 1.415, 1.467, 1.551, and 1.563 L/hr respectively. Higher EFC will increase the fuel consumptions.

Keywords: Power tiller, soil moisture, ploughing depth, speed, fuel consumption, effective field capacity

CHAPTER 1

INTRODUCTION

1.1 Overview of Agriculture in Malaysia

1.1.1 Agriculture in Malaysia

Agriculture sector in Malaysia is one of the important sectors for the development of economics for the country. It became too important because the sector also contributes in gross domestic product (GDP) besides it provides a job opportunity for unemployment people and raise incomes for the farmers that have in this sector. In addition, the agriculture sector is also important to ensuring the national food security. The agriculture sector consists of various sub-sectors that is rubber, oil palm, livestock, logging and forestry, aquaculture, fisheries, and other agriculture, including fruits, pineapple, vegetables, paddy, tea, cocoa, pepper, coconut, flowers, and tobacco. Due to the increase in size of world population and give strength to the world of economy, the agriculture sector in Malaysia has the best opportunity to grow and increase its contribution to national income as well as to support the Ringgit's foreign exchange valuation. In order to fully utilize the resources such as labor, capital, land and entrepreneurship, the Malaysian agriculture sector must be growing and develop more its productivity to cover it. Besides that, agricultural sector also must create new technologies for developing and advancing the production in the sector. Next, the workforce in this agricultural sector also must be continuously amplifying the