

**A CASE STUDY OF COMPARISON ON PERFORMANCE AND
OPERATING COST BETWEEN MANUAL SICKLE AND MOTORIZED
CUTTER FOR HARVESTING OPERATION IN OIL PALM PLANTATION**

**GUNAWAN BIN ROSMEN
2013561495**

**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Plantation Technology and Management
in the Faculty of Plantation and Agrotechnology
Universiti Teknologi MARA**

JULY 2016

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my degree of Bachelor of Science (Hons.) Plantation Management and Technology in the Faculty of Plantation and Agrotechnology and for completing this challenging journey successfully. My gratitude and thanks go to my supervisor, Mr. Muhammad Aliuddin bin Bakar, thank you for the support, patience and ideas in assisting me with this project.

His guidance really helps me in the process to completing this dissertation successfully. I also would like to express my sincere to all the lectures, especially to Mr. Syahrizan Syahlan who help me out with their constructive ideas, comments and suggestion which have been of great help throughout this research.

My appreciation also goes to my family members, especially my parents Mr. Rosmen bin Abd Razak and Nordiah binti Mustapha that continuously give support that greatly help me to accomplish this dissertation until the end. This dissertation also successfully finished with the help of my friends that sincerely help me in the process of this dissertation.

Finally, I would like to extend my deepest appreciation to all staff JOHAWAKI Plantation and who have contributed in one way or another towards the success of this final year project.

GUNAWAN BIN ROSMEN

TABLE OF CONTENTS

	<u>Page</u>
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
ABSTRAK	xi
<u>CHAPTER</u>	
1 INTRODUCTION	
1.1 Background	1
1.2 Problem statement	2
1.3 Significance of study	3
1.4 Scope and limitation of study	4
1.5 Objective of study	4
2 LITERATURE REVIEW	
2.1 Oil Palm	5
2.2 Harvesting program	6
2.2.1 Optimum time for harvesting	7
2.3 Harvesting practices in oil palm	8
2.3.1 Traditional harvesting oil palm	8
2.3.2 Manual harvesting	9
2.3.3 Mechanical harvesting	10
2.4 Mechanization Practices in Oil Palm	11
2.4.1 Advantages of Use Mechanization	11
2.4.2 Mechanization of Oil Palm Harvesting Tools	12
2.4.3 Efficiency Analysis of Use Motorized Cutter	14
2.5 Cost Analysis	15
2.5.1 Ownership Cost	15
2.5.2 Operating Cost	17
2.5.3 Total Cost	19
2.5.4 Performance Rate	20
3 RESEARCH METHODOLOGY	
3.1 Test materials	22
3.2 Location of study	22
3.3 Experimental Procedure	23
3.4 Statistical analysis	24
3.5 Task Description	24
3.6 Data Collection	25
3.7 Cost	26
4 RESULTS	
4.1 Efficiency of Harvesting Application	29
4.1.1 Time Taken Mean for Manual Harvesting Operation	29

ABSTRACT

COMPARISON OF PERFORMANCE AND OPERATING COST BETWEEN MANUAL SICKLE AND MOTORIZED CUTTER IN HARVESTING OIL PALM

From this paper, it is an effort to investigate the most efficient harvesting tools that must be applied by all oil palm producer. It is similarly to identify which harvesting tools is the most efficient that reflected to the labor productivity and cost management for harvesting operation. The Motorized cutter and manual sickle was tested based on capacity and cost involve. Trials carried out on motorized cutter revealed that the productivity of the machine was around 450 bunches per day (7.4 tonne per day at average bunch weight 17kg). The productivity depends on the cropping level, field condition, and the operator skill. Comparing to the manual sickle, is only around 250 bunches per day (4.2 tonne per day). Therefore, by using motorized cutter the estate would reduce 50% of its labour requirement in the harvesting operation. In addition the EFC for motorized is superior than manual with 0.29 ha per hour for motorized and 0.22 ha per hour for manual. As for the cost involved in both harvesting tools, the motorized cutter cost is RM 4500 plus its operational costs, the harvesting cost comes to RM 8.78 per tonne and for the manual sickle cost is RM 143 plus its operating cost, it comes to RM 10.14 per tonne.

Keywords: harvesting oil palm, motorized cutter, manual sickle, field capacity, operating cost.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Agricultural sector act as the main contributor of Malaysia economy, especially for the first 30 years after our nation achieved independence (Kamruddin *et al.*, 2007). The agriculture sector, especially oil palm was playing a prominent role in consolidating national economy since the production is expected to contribute RM 100 billion by 2020 (Veloo and Hitam, 2011). Oil palm (*Elaeis guineensis*) becomes a priority to be planted because of the suitability of the plant that can grow with the Malaysia climate and the cash can be generated from the oil palm production. Development of oil palm basically to provide employment for local people and to meet the demand of human for oil palm by product such oil and fat (Wastie and Earp, 1972) food and others.

Oil palm was planted commercially by producer in Malaysia for commercial purpose has approximately in 5.0 million hectares. According to Basiron (2007), oil palm production was shown to significantly increase from 94,000 tonnes in 1960 to 15 million tonnes that recorded in 2005. This shows that the production was increased up to 160 times for 45 years. The increasing world demand, especially for oil and fat and stable price makes the palm oil become popular to be chosen than other commodity crops such as rubber, cocoa and pineapple. For that reason, the expansion of the oil palm plantation area leads to the needs of labors to accomplish tasks in the