

**INVESTIGATION ON PERFORMANCE AND COST OF COMBINE
HARVESTER: A CASE STUDY AT KG PIASAU PADDY FIELD, KOTA BELUD,
SABAH**

JUEM PANAMBONG

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

JULY 2019

ACKNOWLEDGEMENTS

Thanks to God for giving me endless blessings, knowledge and strength that enable me to work on and completed my Final Year Project (FPA690) successfully. Without Him who gave me the strength, I would not be able to complete this thesis successfully.

I would like to express my special gratitude to my final year project supervisor, Mr Muhammad Aliuddin bin Bakar for his tremendous efforts, guidance, and supports to me in completing this final year project's report. It was an honour to complete this thesis under his supervision. I also acknowledge with thanks the lecturers of AT220 for their continuous supports, encouragement and involvement in my thesis writing progress.

Thank you also given to the owner of the rice combine harvester, the operators of combine harvester and the paddy growers in Kg Piasau for allowing me to conduct a case study in their place, and also for their contribution and cooperation during my data collection. They had given me lessons and information from the time I started my data collection until I gathered all the required data for my study.

Next, special thanks to my parents and families that continuously supporting and motivating me to do my best, to take an opportunity to gain knowledge and experiences throughout this study.

Thank you to all of my friends, batchmates, classmates and the special, ABETmates for their willingness to share and exchange their knowledge with me. They had contributed help to finish this thesis. Last but not least, thanks to those who involved directly and indirectly, helping me in completing my final year project's thesis. Your guidance and help gave me many information and knowledge that will be very valuable to me.

JUEM PANAMBONG

TABLE OF CONTENTS

	<u>Page</u>
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1: INTRODUCTION	1
1.1 Research background	1
1.2 Problem statement	3
1.3 Significance of the study	4
1.4 Objectives of the study	5
1.5 Scope of study	5
CHAPTER 2: LITERATURE REVIEW	6
2.1 Mechanization in the agriculture sector in Malaysia	6
2.2 Paddy combine harvester	7
2.3 Performance	8
2.4 Field capacity	8
2.4.1 Theoretical field capacity	9
2.4.2 Effective field capacity	9
2.5 Cost	9
2.5.1 Fixed cost	10
2.5.1.1 Depreciation	10
2.5.1.2 Tax, shelter, insurance, interest	11
2.5.2 Operating cost	12
2.5.2.1 Fuel and lubricant cost	12
2.5.2.2 Repair and maintenance costs	13
2.5.2.3 Salary	13
CHAPTER 3: RESEARCH METHODOLOGY	15
3.1 Location of study	15
3.2 Parameter of the study	16
3.3 Data collection	16
3.4 Data analysis	17
3.5 Conceptual framework	18
3.6 Research procedure	20
3.7 Specification of the selected machine	21

3.8	Motion study	22
3.9	Estimation of working data on the selected machine	23
CHAPTER 4: RESULT AND DISCUSSION		24
4.1	Estimated machine capacity	24
4.2	Estimated machine performance	24
4.2.1	Average of speed	24
4.2.2	Average of theoretical field capacity (TFC)	25
4.2.3	Theoretical field capacity (TFC)	25
4.2.4	Effective field capacity (EFC)	26
4.2.5	Field efficiency (FE)	26
4.3	Estimated fixed cost	27
4.3.1	Depreciation	27
4.3.2	Tax, shelter, insurance, interest and transportation	28
4.4	Estimated operating cost	31
4.4.1	Operating cost of five years	31
4.4.2	Total operating cost of five years	33
4.5	Estimated fixed, operating and total cost per hectare	36
4.5.1	Total fixed cost per hectare	37
4.5.2	Total operating cost per hectare	38
4.5.3	Total cost per hectare	39
CHAPTER 5: CONCLUSION AND RECOMMENDATION		41
5.1	Conclusion	41
5.2	Recommendation	42
CITED REFERENCES		43
APPENDICES		46
CURRICULUM VITAE		59

ABSTRACT

STUDY ON PERFORMANCE AND COST OF COMBINE HARVESTER: A CASE STUDY AT KG PIASAU PADDY FIELD, KOTA BELUD, SABAH

The implementation of machinery in agriculture sector in our country had brought positive impacts to the agriculture operation. Other than increasing the productivity and efficiency to the operations, it also cuts the cost of labours. This study was conducted with aims to study and evaluate the performance, fixed cost, operating cost and the efficiency of the combine harvester, based on the time of life of the machine. The study was conducted in Kg Piasau paddy field, Kota Belud, Sabah. Primary data was collected on the field, based on the motion study conducted to obtain the average of both time and speed of the combine harvester in conducting the operation. The model of a combine harvester that was evaluated in the motion study is New Holland Clayson 1545. This machine harvester's performance, TFC, EFC and FE were determined based on the average. The TFC, EFC and FE were determined to be 2.15 ha/hr, 1.21 ha/hr and 56.28% respectively. The average speed during operating on site was studied to be 5.10 km/hr. For the secondary data, it was obtained to identify the field of operation and the cost for five years of use of the paddy combine harvester. The calculation was then made using formulas, and the fixed and operating cost spent in those five years was interpreted. The depreciation had known to decline up to 86.94% in five years. The assumption on cost per year of the shelter, insurance and transportation was RM6000. As for the highest fixed and operating cost, it was recorded in 2014 with the amount of RM20.66/ha and in 2018 with an amount of RM53.92/ha respectively. In this study, the performance and efficiency of the combine harvester might be subjective to few factors such as the working area condition, the machine condition, the worker's skill and the paddy field owner's obligation. The outcome information of this study can be useful to the owner to manage cost in the future.

Keywords: *Performance, Efficiency, Fixed cost, Operating cost.*