INDEPENDENT OIL PALM SMALLHOLDERS PERCEPTION TOWARDS BIOFERTILIZERS IN MALAYSIA

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DECLARATION

This Final Year Project is a partial fulfilment of the requirements for a degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

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NURUL FATIN BT ISMAIL

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LIST OF ABREVIATIONS

UiTM	Universiti Teknologi Mara
MPOB	Malaysian Palm Oil Board
IFC	International Finance Corporation
SPSS	Statistical Packages Social Science
MPOC	Malaysian Palm Oil Council
Sig	Significant
Et al	And others
Sig	Significant level
KMO	Keiser-Meyer-Olkin
%	Percent

ABSTRACT

INDEPENDENT OIL PALM SMALLHOLDERS PERCEPTION TOWARDS BIOFERTILIZERS IN MALAYSIA

Oil palm is one of the major crops planted in Malaysia. Smallholders are key agents for advanced country wide palm oil yields and development of the industry. For ultimate plant increase, nutrients need to be available in sufficient and balanced portions(Mohammadi and Sohrabi, 2012). Bio fertilizers are important additives of included nutrients control. This study was conducted to investigate the relationship between independent variables and oil palm smallholder's perception towards bio fertilizers and to determine the most dominant factor that influence oil palm smallholder's perception towards bio fertilizers. Survey method was used for data collection. This study involves 66 respondents which is independent smallholders that lived at Felda Bukit Waha, Johor. Statistical for Science Computer Software (SPSS) were used to analyze result based on descriptive analysis and factor analysis. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was 0.868 indicates the value was acceptable which means factor was appropriate for the data. Factor analysis result shows that benefits factor was the dominant attribute which represented by three factors that eigenvalues more than 1, first factor is benefit. Second factor is level of knowledge and third factor is cost of bio fertilizer. It was 66.037% of total variance explained by factors. Therefore, it can be conclude that was a significant relationship between factors and perception of oil palm independent smallholders towards bio fertilizer. As a recommendation, independent smallholders should be actively involved in program that encouraged them to used bio fertilizer for environmental sake in the future. From this study I obtained positive perception from independent smallholders.

Keywords: independent smallholders, perception and bio fertilizer

ABSTRAK

PERSEPSI PEKEBUN KECIL KELAPA SAWIT TERHADAP BAJA BIO DI MALAYSIA

Kelapa sawit merupakan salah satu tanaman utama yang ditanam di Malaysia. Pekebun kecil adalah agen utama bagi menghasilkan kelapa sawit untuk negara maju dan pembangunan industri. Bagi pertumbuhan tumbuhan yang paling berkesan, nutrien perlu tersedia dalam bahagian yang cukup dan seimbang (Mohammadi dan Sohrabi, 2012). Baja Bio adalah aditif penting kawalan nutrien yang termasuk. Kajian ini dijalankan untuk menyiasat hubungan antara pembolehubah bebas dan persepsi pekebun kecil kelapa sawit terhadap baja bio dan untuk menentukan faktor yang paling dominan yang mempengaruhi persepsi pekebun kecil kelapa sawit terhadap baja bio. Kaedah tinjauan digunakan untuk pengumpulan data. Kajian ini membabitkan 66 orang responden iaitu pekebun kecil yang tinggal di Felda Bukit Waha, Johor. Perisian Statistik untuk Perisian Komputer Sains (SPSS) digunakan untuk menganalisis hasil berdasarkan analisis deskriptif dan analisis faktor. Kaiser-Meyer-Olkin Pengukuran Kesesuaian Pensampelan (KMO) adalah 0.868 menunjukkan nilai itu boleh diterima yang bermaksud faktor yang sesuai untuk data. Hasil analisis faktor menunjukkan bahawa faktor faedah adalah sifat utama yang diwakili oleh tiga faktor yang nilai eigen lebih daripada 1, faktor pertama adalah faedah , faktor kedua adalah tahap pengetahuan dan faktor 3 adalah kos baja bio. 66.037% daripada jumlah varians yang dijelaskan oleh faktor . Oleh itu, dapat disimpulkan bahawa hubungan yang signifikan antara faktor dan persepsi pekebun kecil bebas kelapa sawit terhadap baja bio. Sebagai cadangan, pekebun kecil bebas harus terlibat secara aktif dalam program yang menggalakkan mereka untuk menggunakan baja bio untuk kepentingan alam sekitar pada masa akan datang.

Kata kunci: pekebun kecil bebas, persepsi dan baja bio

CHAPTER 1

INTRODUCTION

1.1 Research Background

Oil palm tree (Elaeis guineensis) derived from British African wherein it grows inside the jungle and after that become into an agriculture crop. It became introduced to Malaysian and then Malaya from British as a decorative crop. In 1917 the first palm oil plantation began in Tennamran estate in Selangor, putting ideas for bigger oil palm plantations and large industries in Malaysia (Malaysian Palm Oil Council, 2013).

Government added land and agreement project for the cultivation oil palm as approach to terminate destitution for farmers and smallholders who have no land. Oil palms at Malaysian have very large commitment primarily based at the real estate management and smallholders' scheme (Malaysian Palm Oil Council, 2013).

Malaysia is surely one of the largest producers and exporters of palm oil within the international, contributed as much as 11% in the arena's 27% exports of artificial oils and fats .Oil palm planted in 2018 reaches 5.85 hectares, and cut 0.7% in the direction of 5.81 million hectares the preceding 12 months (Malaysian Palm Oil Board, 2019).

Palm trees will begin and produce fruits after 30 months of planting and stay competent for the subsequent 20 to 30 years old consequently produce a regular deliver oils. Each ripe bunch is typically referred to as Fresh Fruit Bunch (FFB). Oil Palms that planted in Malaysia is specially tenera range which is hybrid among the dura and pisifera. The outcome of tenera approximately 4 to 5 tonnes of crude palm oil (CPO) consistently and 1 tonne of palm kernels. Oil palm products that was export by Malaysia in 2018 was 24.88 million tonnes, improve 3.8% than 23.97 million tons exported in 2017 (Malaysian Palm Oil Board, 2018).

Fertilizer is a critical detail for oil palm production and contributing high yield in the direction of oil palm manufacturing. Amongst seven factors accountable for better yields, fertilizer turned into the maximum crucial accounting for 29% of the yield increment and constituting the very best operational price in nicely run plantations in Malaysia (Tchatchoua Dorothy Tchapda, 2016).

For ultimate plant increase, nutrients need to be available in sufficient and balanced portions (Mohammadi and Sohrabi, 2012). Bio fertilizers are important additives that included nutrients control. The capability of bio fertilizers would enhance function for productiveness and soil preservation and additionally protecting the surroundings as ecofriendly and powerful inputs for the farmers.

This take a look at will focus on oil palm smallholders' perception towards bio fertilizers. The usage of bio fertilizer is vital to cutting-edge attempt to make the agriculture industry a possible factor of a healthful and safe environment.

1.2 Problem statement

As we understand, smallholders are instead reliable with chemical fertilizers. In truth, Asia is the biggest place use of chemical fertilizers, around 40% of the worldwide each 12 months (Rahim, 2002). In spite of the reality that the exercising of the use of chemical fertilizers and pesticides accelerates soil acidification, it furthermore poses the threat of contaminating ground water and the surroundings (Itelima, Bang, Onyimba, Sila and Egbere, 2018).

Besides that, smallholder's lack of knowledge approximately advantages of bio fertilizers. They did not encouraged with the benefits of bio fertilizers that are growth nitrogen content of soil and the deliver or availability of nitrogen to leguminous, growth soil fertility, fertilizer use efficiency and in the long run the yield by means of 20-30 % in widespread.

Other than that, the effect on crop is slow as compared to chemical fertilizer. The nutrients from bio fertilizer are released to plant slowly and steadily for more than one season. This is to protect the environment as an eco-friendly.

1.3 Objective of study

I. To determine the relationship between independent variables and oil palm smallholder's perception toward bio fertilizers.

II. To decide the most dominant issue that have an impact on oil palm smallholder's belief towards bio fertilizers.

1.4 Significance of the study

This take a look at specializes in belief of oil palm independent smallholders towards bio fertilizers. In this study will help to increase fine notion of smallholders toward bio fertilizers. It is due to the fact a lot of them favor to use chemical fertilizer as compare to bio fertilizer. Through this examine case, a lot can be shared which includes the advantages of bio fertilizers toward soil and surroundings and additionally the right technique to use fertilizers. Furthermore, it may predict to lessen consumption inorganic fertilizers. This will help smallholders to change from their antique practice using chemical fertilizers. It is because the continuous use of chemical will convey harm to them and also to the environment. It is also can reduce the value of fertilizers use.

1.5 Study scope

This take a look at is performed on the way to determine oil palm smallholders' perception towards bio fertilizers in Malaysia. The sort of data for this have a look at is primary data. The independent variable used is cost of bio fertilizers, level of knowledge, environmental constraints and benefits of bio fertilizers. The dependent variable is oil palm smallholders' perception.

1.6 Limitations of study

There were some problems during this survey which is the barrier of area. This study was conducted at Felda Bukit Waha, Kota Tinggi,Johor. So, this study will dealing with small amount of respondent and the data is not enough as compare to large area. Besides, smallholders' perception may not accurate or bias. This will affect the objective of this study. Other limitation is lack of cooperation among respondents. There will be some of respondents that are unwilling to fully answer the questionnaire due to lot of question.

1.7 Hypothesis of study

1. Objective 1

H0: There is no significant relationship for benefits of bio fertilizers in oil palm smallholders' perception in Malaysia.

H1: There is significant relationship for benefits of bio fertilizers in oil palm smallholders' perception in Malaysia.

2. Objective 2

H0: There is no significant dominant factor for benefit of bio fertilizers in oil palm smallholders' perception in Malaysia.

H1: There is significant dominant factor for benefits of bio fertilizers in oil palm smallholders' perception in Malaysia.

CHAPTER 2

LITERATURE REVIEW

2.1 Oil Palm Origin

At 1870, oil palm was first time brought to Malaysia. Started from 1960, planted region has expanded at speedy fast. During 1985, area of oil palm planted increase from1.5 million hectare to 4.3 million hectares in 2007. It has become to be the maximum vital crop in Malaysia. Palm oil is growing and growing in oil palm estates that can be found throughout the country, from Perlis to Sabah. Overall oil palm location turned into 5.85 million hectares in 2018 (Malaysian Palm Oil Board, 2019).

The palm fruit is located in a large bulky bunch weighing among 10 kg to 50 kg. A bunch may have as much as two thousands fruits along with tough kernel (seed) within a shell (endocarp). Mesocarp is made from approximately 49% of the oil and approximately 50% of kernel.

Palm oil and palm kernel oil have very different compositions. Palm oil was produce from the mesocarp consists of mainly palmitic acid (C16: 0) and oleic acid (C18:1) and the two most not unusual fatty acids in herbal oils and fat. It is 50% saturated. Palm kernel oil is more than 80% saturated and contains lauric acid (C12:0).

2.2 Overview of smallholders

Smallholders are major representative for producing advanced palm oil and industrial development. In Malaysia, 33% of entire oil palm manufacturing and 40% from overall area that is contribute by smallholders. They have been classified have 40 hectares and hold land or land titles (Awang et al., 2017).

There are two type of smallholder which is dependent smallholders and independent smallholders. But on this look at most effective involve independent smallholders.

Independent smallholders

Independent smallholders are farmers who domesticate oil palm without direct help from organized authorities corporations and personal corporations. Independent smallholder own 16.8% of oil palm area at year 2018 (Malaysian Palm Oil Board, 2019). They inherited the plantation from the family and selling their crops to local factories both direct or thru provider fruit. They constantly produce lower yields as compare to large plantation The government centered at impartial oil palm smallholders to supply 22 tons fresh fruit bunches (FFB) through 2020 (Awang et al., 2017).

2.3 Overview of bio fertilizer

Bio fertilizer is a material which incorporates dwelling micro-organism which, while carried out of seed, plant surfaces, or soil, colonizes the rhizosphere into plant and enhances boom to increase the deliver and available number one vitamins to host plant (Suryawanshi, Yadaw, & Verma, 2013). Generally, bio fertilizer can also be referred to as microbial inoculants. It carries live and efficient formulates of bacteria, algae and fungi both one after the other or in mixture this is able to fixing atmospheric nitrogen, solubilized phosphorus, decompose natural or oxidize sulphur and on use will enhance the availability of vitamins for the advantage of the plant life.

Bio-fertilizers are commonly amended with carrier agents to increase effectiveness of the bio-fertilizers. According to Hari and Perumal, bio-fertilizer is generally known as decided on lines of beneficial soil micro-organism cultured within the laboratory and packing in suitable marketers. In different words, the term bio-fertilizer may be used to cover all natural assets for plant increase that can be provided in the shape available for plant absorption via micro-organisms of plant institutions or interactions.

In Malaysia, the production of inoculated microorganisms began within the late 1940 and multiplied inside the 1970 which guided by means of Bradyrhizobium injection in legumes. The Government studies institute, the Malaysian Rubber Board (MRB) were carrying out studies on Rhizobium inoculums for leguminous cover plant life in the inter rows of younger rubber bushes within the large plantations (Rahim, 2002).

Besides, University Putra Malaysia (UPM) additionally has done many researches because of the truth that 1980's on Mycorrhiza and initiated the studies To assess the contribution of nitrogen from Azospirillum to grease palm seedlings (Halim, 2009).

The increase used of bio fertilizer in Malaysia's agriculture industry is mycorrhiza inoculum. A mycorrhizal study in Malaysia has been outstanding because the 1980's specifically through works finished at Universiti Putra Malaysia. Inoculums Mycorrhiza is an in particular-used and ordinary bio fertilizer inside the Malaysian agricultural organization. The large-scale bio fertilizer productivity is produced.

2.3.1 Benefit of bio fertilizers

Furthermore, the important of bio fertilizers changed into brought to lessen the use of chemical fertilizers indiscriminately in agriculture. Promising results presented by means of bio fertilizer such as in improving meals protection, is boosted from the fact that almost 50 - 74% of the total land mass and populace in developing nations, considerably from the African and Asian areas, had yet reached to be applied (Hanapi, Awad and Aziz, 2012).

There had been plenty of observe that proves the effectiveness and advantages of bio fertilizers. Bio fertilizers maintain wealthy soil surroundings of all sorts of macro and micronutrients through the dedication of potassium nitrogen, phosphate and solubilization of potassium or mineralization, release of plant growth law, production of antibiotics and biodegradation of herbal count

number within the soil. Bio fertilizers, while used as inoculant of seed or soil, reproduce and participate in nutrient cycling and bring about crop productivity. In favored, 60% to 90% of the full used fertilizer is misplaced and the closing 10% - 40% is taken by means of the plant. In most instances to offer vitamins, enhance soil toxicity, pest and disease management, more water use and soil fertility (Mohammadi and Sohrabi, 2012).

Therefore bio fertilizers can be critical agents in integrated nutrient manipulate systems to maintain a healthy agricultural productiveness and environment. Additionally, it will increase 20-30% of crop yield, replaces chemical nitrogen and phosphorus by using manner of 25%, and enhance plant growth. It also can contribute protection closer to drought and some soil-borne illnesses (Pandit, Kapoor and Ametha, 2015). (Azuren and Yusuf, 2014) kingdom that in each gram of bio fertilizers, it carries approximately 10 million cells the ones are doable in diagnosed pressure.

2.3.2 Cost of bio fertilizers

These capability of organic fertilizers function in productiveness and defend the surroundings as eco-friendly thus provide effective yields to the farmers (Mohammadi and Sohrabi, 2012).Using the biological and natural fertilizers, a low input device can help to obtain sustainability of farming. Bio fertilizers are less expensive to farmers because of low charges and they are very momentous in making to be had nutrients like nitrogen and phosphorus to the crop plants (Dodiya, Arts and Arts, 2014). It will lessen the input expenses by means of manner of changing the price of chemical fertilizer. It is because of slowly

response in the direction of crop and step by step for multiple yields. This may additionally reduce the manufacturing fee of oil palm.

2.3.3 Level of Knowledge

People that have knowledge are they understanding and information about a subject. Most of farmers' education is completed primary faculty as their schooling historical past Knowledge is referring to knowledge and records approximately a person has. Nowadays, education may be very crucial for human beings. Lack of knowledge will have an impact on the oil palm control and exercise. This have a look at is sporting out to discover the variables that offer most effect to elements that impact smallholders' perception toward bio fertilizer in oil palm plantation.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Researches technique is a systematized technique to remedy difficulty. It is technology of analyze how studies is complete. The processes using which researchers go approximately their describing, explaining and predicting phenomena are known as research method. It is likewise described as the look at of methods via which know-how is received. Its purpose is to offer the work plan of research.

3.2 Location of survey

This survey is conduct at Kota Tinggi, Johor. The specific area that was chosen is at area Felda Bukit Waha. Felda Bukit Waha is one of organized settlement scheme in Kota Tinggi district, Johore. Located approximately 32 km from urban centers , Felda Bukit Waha or with old spelling "Felda Bukit Wah Hah" neighboring with two more land scheme namely Felda Bukit Easter and Felda Simpang Waha.

This land scheme began to be occupied about in beginning of the year 1980 .Generally people that live here is Felda settler's child. There are two types of smallholders here which are independent smallholders and dependent smallholders under Felda. Total area that planted by oil palm is 1133.5 hectare.

Total area that was managed by independent smallholders is 309.7344 hectares. There are 81 independent smallholders at Felda Bukit Waha.

3.3 Data collection method

3.3.1 Types of data used

The statistics can be from oil palm independent smallholders. This have a look at makes use of number one data amassed from head to head interview with the use of based questionnaire. Questionnaire is a set of questions has been organized to ask some of questions and acquire solutions from respondents to studies subject matter.

Questionnaire is the maximum common facts collecting method. The procedure possibly also looks very simple due to the fact after we've got a pattern or recognition from respondents. From that we just ask the questions and record the solutions. The hard element is detecting the best respondents and questions. The superiority of this facts amassing method is that we are able to get heaps of information. For our look at motive a fixed of questionnaires has been prepared to collect records referring to the subject of the look at. In this study a good questionnaire has been used with unique kinds of questions which includes closed ended and open ended.

3.3.2 Parameter

The parameters of this survey are benefit of bio fertilizer, price of bio fertilizer and level of knowledge.

3.3.4 Data Analysis

Analysis records are a system of taking records and reworking process of taking data and to make selection and conclusion. The facts may be completed after integrate two matters to make choice

3.4 SPSS (Statistical Packages Social Science)

SPSS Statistical Packages is software that will be used to evaluate the data collected easily. It is important to show an undesirable way when translate data. All information are processed via record by file. The information accumulated by way of questionnaire will be analyzed through SPSS software. All of the records from questionnaires transfer to SPSS software program and the end result could be shape into of any form of geographically.

3.4.1 Statistical analysis

Statistical evaluation have a look at of statistics and to procedure information with end result that clean to examine and apprehend statistic evaluation examines every single records sample in a population (the set of gadgets from which samples may be drawn), rather than a go sectional representation of samples as less sophisticated techniques do. In addition, it can provide records for entire programs due to the fact it can determine blunders in some of surveys.

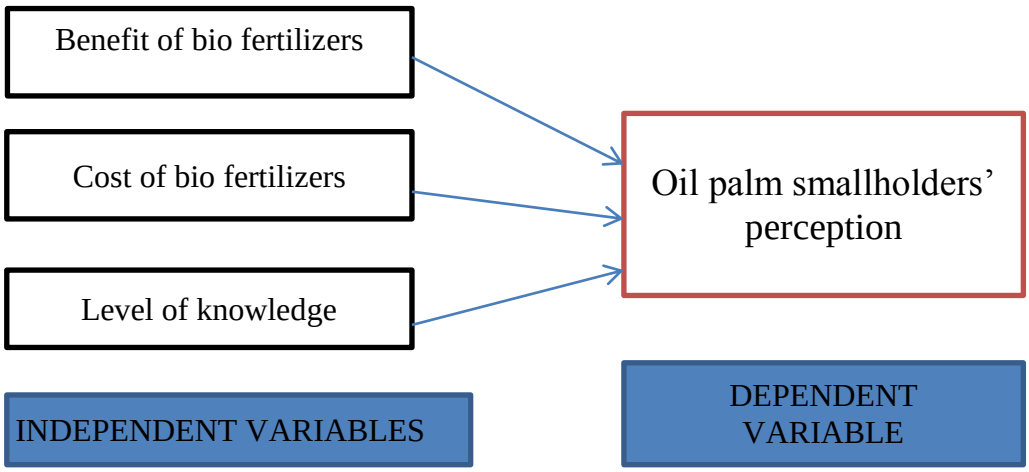

Figure 3.1 Theoretical Framework

3.4.2 Factor analysis

Factor evaluation attempts to identify elements that explain the sample of correlation inside a fixed of observe variables. Factor evaluation is used for facts lowering or shape detection. The characteristic of facts discount is to throw redundant (incredibly correlated) variables from the facts files and the structure detection is take a look at the underlying courting among the variables In every evaluation, there are equal numbers of factors. Each component has a sure quantity of the overall variance inside the determined variables and factors are always indexed in order of the way much variant they explain. Goal is to unearth group of the items which are strongly interrelated.

3.5 Sampling Design

Simple random sampling or random sampling is the purest and honest possibility sampling strategy. It is likewise the maximum popular approach for choosing a sample among population for a huge range of purposes. In simple random sampling each member of populace is similarly likely to be chosen as part of the pattern it has been said that the good judgment at the back of easy random sampling is that it eliminates bias from the selection system and have to bring about consultant samples.

3.6 Pilot test

Pilot trying out additionally referred to as pre-checking out way specific small-scale trial issue. This test entails the usage of a small variety of respondents to check the appropriateness of the questions and their comprehension. Usually, the draft questionnaire is attempted out on a collection. This is selected on a convenience and similar in make-up to the only in the end can be sampled. The cause is to keep away from problem in recording the statistics.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, it is explains the results of the analysis completed at the gathered information. Descriptive evaluation which represents the respondent's personal detail will be in the first part. Legibility was determined by the results that are obtained from reliability test. Other part will be a factor analysis which is to investigate which interrelates strongly among the variable .The end result can be processed by the usage of SPSS to acquire the goal.

4.2 Descriptive analysis

Descriptive evaluations clarify about demographic survey which has general populations of 81 overall respondents and the sample is 66. There are about general information of this survey such as gender, race, age, marital status, and education level and monthly income of respondents.

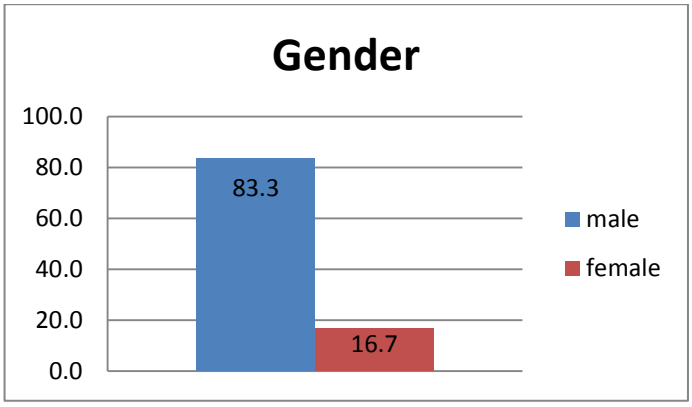

Figure 4.1 Genders of Smallholders

The graph above shows about the gender data of 66 respondents at Felda Bukit Waha in Kota Tinggi that were picked up. It shows that respondents of male are higher than female. It is because the sample was use simple random sampling consists of 83.3% which is 55 male respondents and 16.7% which are 11 female respondents.

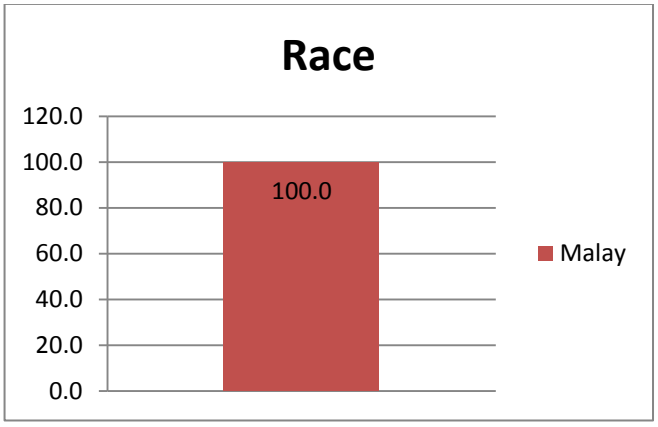

Figure 4.2 Races of Smallholders

For race category, it shows 66 respondents at Felda Bukit Waha, Kota Tinggi, Johor that were picked up. Mostly, the entire respondents were Malay. It is because all the independent smallholders that registered were Malay. Actually Felda not only set apart to help poor Malay in fact another race of Chinese community and Indian community.

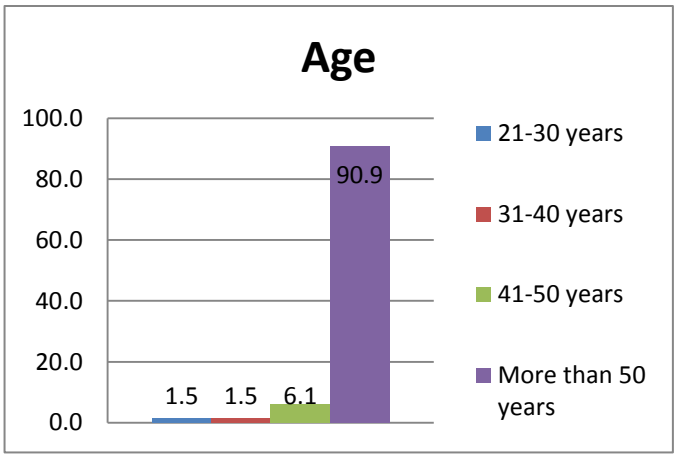

Figure 4.3 Ages of Smallholder

For the age category, it also shows 66 respondents at Felda Bukit Waha, Kota Tinggi, Johor that were picked up. The highest percentage is 90.9% which is age above 50 years old as compare to others age as it take 60 respondents from 66 respondents. Second is 6.1% which is age between 41-50 years old with 4 respondents. There is percentage which is 1.5% which is respondent for age between 21-30 years old and 31-40 years old which is only taking 1 respondent. From the data, it shown that most of oil palm independent smallholders is age above 50 years old.

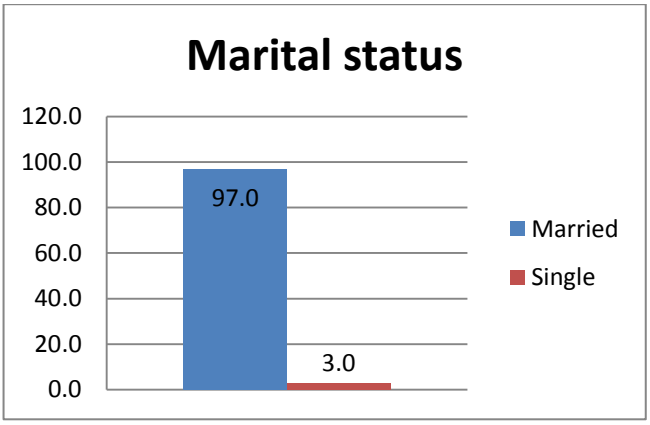

Figure 4.4 Marital Status Of Smallholders

Next is marital status. It shows status of the 66 respondents at Felda Bukit Waha,Kota Tinggi, Johor that were picked up. The table shows the status married of respondents is the highest percentage which is 97.0% who is take 64 respondents out of 66 respondents. Another is 3.0% which is 2 respondent's marital status is single because they replace their father to manage their farm. This mean that dominant of respondents is married respondents that live in Felda Bukit.Waha, Johor.

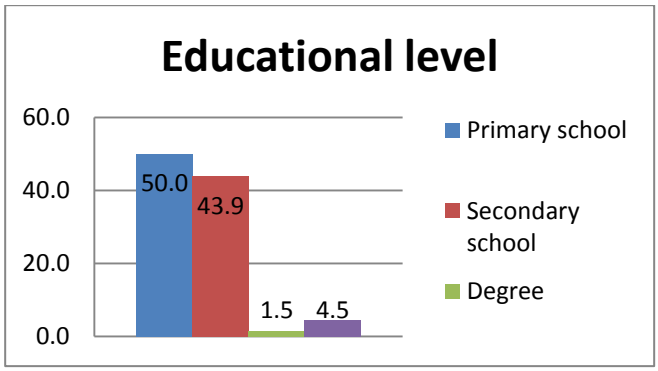

Figure 4.5 Educational Levels of Smallholders

Then it is educational level. It shows the status of the 66 respondents at Felda Bukit Waha,Kota Tinggi, Johor that were picked up. The highest percentage is 50.0% which is number of respondent at primary schools which are 33 respondents. Second is 43.9% which are secondary schools which take 29 respondents. There are 3 respondents with no education level which label as others with 4.5%. Out of 66 respondents only 1% which is 1 respondent has higher level of education which is degree. This meant that dominant of respondent education level is at primary school.

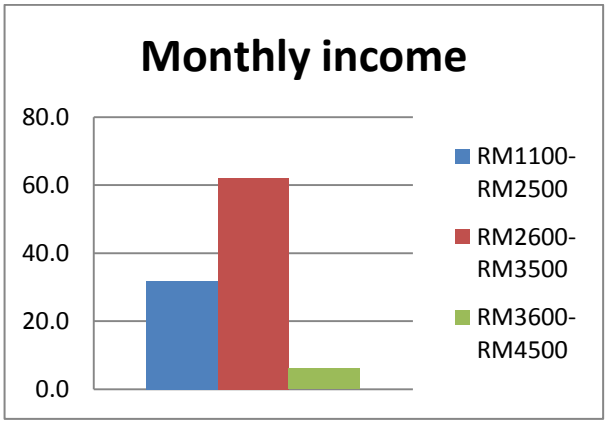

Figure 4.6 Montly Income of Smallholders

Last category is mostly income. It shows status of the 66 respondents at Felda Bukit Waha,Kota Tinggi, Johor that were picked up. The highest percentage is 62.1% which is number of monthly income is between RM2600-RM3500 which takes out 41 respondents. Second is 31.8% which take out 21 respondents which is between RM1100-RM2500. Another is 6.1% which is 4 respondents who has between RM3600-RM4500 monthly incomes. From the data it shows that respondent's dominant monthly income is between RM2600-RM3500.

4.3 RELIABILITY TEST

This test is being used to degree the consistence and toughness of variables. Each variable involves with level of knowledge, benefits of bio fertilizer, cost of bio fertilizer and environmental constraint. The perception of oil palm independent smallholders towards bio fertilizer must go through reliability test using Cronbach's Alpha, α (or coefficient alpha) that provide to degree of the internal consistency of a take a look at or scale. It is expressed as a number between 0 and 1. (Koonce & Kelly, 2014) offer the following regulations of thumb which are more than 0.9 is excellent, more than 0.8 is good, more than 0 .7 is acceptable, more than 0.6 is questionable, more than 0 .5 is poor and less than 0 .5 – Unacceptable)**.**

Table 4.1 above shows the result of reliability test. Cronbach's alpha value is to measure dependent and independent variable. Since the Cronbach's alpha is greater than 0.5 and more than 0.8 that means it is good and the study can be continue.

Table 4.1 Reliability Test

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of items
.820	**.825**	**17**

4.4 FACTOR ANALYSIS

The vast motive of this analysis is to summarize information in order that relationships and styles may be effortlessly interpreted and understand. It is commonly used to regroup variables into a restrained set of clusters primarily based totally on divided variance.

Factor assessment is practical for research that include a few or many variables, gather from record, or a number of respondent which may be decreased to a smaller set, to get at an underlying idea, and to facilitate interpretations (Yong and Pearce, 2016).Factor analysis became used so as to investigate the propensity of factors (benefit, degree of understanding and cost of bio fertilizers) towards belief of oil palm independent smallholders toward bio fertilizers. In this study, selection clarified by means of unbiased variable to get percent of overall version established variable.

4.4.1 KMO and Bartlett's Test

Table 4.2 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.868**
Bartlett's Test of Sphericity	Approx. Chi-square	472.004
	df	78
	Sig.	.000

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic that shows the percentage of variance in your variables that might be due to underlying factors. High values near 1.0 usually suggest that an aspect evaluation may be beneficial together with your statistics. If the value is much less than 0.50, the consequences of the aspect records probable won't be very beneficial. The KMO value is 0.868 that does can be considered as right and ideal. So that we will say that factor analysis in this study is suitable. Bartlett's is used check to measure the relationship between the variables. For those data, Bartlett's take a look at is 0.000 is particularly sizable P more than 0.001, consequently aspect analysis is appropriate.

4.4.2 Rotated Component Matrix

Table 4.3 Rotated Component Matrix a

	Factor		
	1	2	3
Bio fertilizers can enhance soil fertility	**.846**		
Bio fertilizers can increase crop yield by 20-30%	**.870**		
Bio fertilizers can help stimulates plant growth	**.912**		
Bio fertilizers can help to lessen the indiscriminate use of chemical fertilizers in agriculture	**.813**		
Bio fertilizer can help to improve food security	**.787**		
I know about the existing of bio fertilizer		**.546**	
I have an education about bio fertilizer in agriculture		**-.125**	
I have a source of information about bio fertilizer		**-.489**	
I have a social participation in promote bio fertilizer to other smallholders		**.756**	
I am family-based producer		**.722**	
Price of bio fertilizer influences your decision to choose bio fertilizer			**-.579**
Cost of biofertilizer is cheaper than chemical fertilizer			**.335**
Variations in type of biofertilizer affect your decision in purchasing biofertilizer			**.851**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization

a. Rotation converged in 4 iterations.

The most dominant factor for perception of oil palm independent smallholders towards bio fertilizer turned into summarized in Table 4.3. The element was arranged in line with the share of overall variance explained and the maximum dominant component between benefits, level of knowledge and cost on perception of oil palm independent smallholders towards bio fertilizer had been stated.

From table 4.3 the maximum dominant factor that motivated respondent perception against bio fertilizer was level of knowledge. These factors have five variables. The sub-variables were bio fertilizer can enhance soil fertility (0.846). The bio fertilizers play a critical function in enhancing the fertility of the soil(Pandit et al., 2015) . Bio fertilizers can increase crop yield by 20-30% (0.870) and bio fertilizer can help stimulate plant growth (0.912).Bio fertilizers can help to lessen the indiscriminate use of chemical fertilizer (0.813) Long time use of bio-fertilizers is reasonably-priced, eco-friendly, extra efficient, productive and on hand to marginal and small farmers over chemical fertilizers (Masso, Ochieng and Vanlauwe, 2015). Bio fertilizer can help improve food security (0.787). From this result it sub-variables more concern about benefits of bio fertilizers. Respondents give perception based on the advantage or

benefits of bio fertilizers. Bio fertilizer used also influenced by smallholder's knowledge from the previous research. They are described as products containing natural happening micro-organisms which can be artificially expanded to enhance soil fertility and crop productivity.

The second factor that influences smallholders' perception towards bio fertilizers is level of knowledge about bio fertilizers. This factor contain of five sub-variables which are I know about the existing of bio fertilizer (-0.125), I have an education about bio fertilizer in agriculture (-0.489), I have a source of information about bio fertilizer (0.521), I have a social participation in promote bio fertilizer to other smallholders (0.756) and I am family based producer (0.722).

The last factor is cost of bio fertilizer. This factor contain of three sub-variables which are price of bio fertilizer influences decision to choose bio fertilizer (-0.579), cost of bio fertilizer is cheaper than chemical fertilizer (0.335) and variation in type of bio fertilizer affect your decision in purchasing bio fertilizer (0.851). Well-known, when farmers achieve a price cost ratio better than three to four, the willingness to undertake a singular agricultural generation will increase as a result of the marketplace opportunities.

4.4.3 Total Variance Explained

Table 4.4 Total Variance Explained

Factors	Initial Eigenvalues			Extraction of sum squared loading		
	Total	% of variance	Cumulative (%)	Total	% of variance	Cumulative (%)
1	5.931	45.623	45.623	5.931	45.623	44.748
2	1.479	11.380	57.003	1.479	11.380	56.885
3	1.174	9.034	66.037	1.174	9.034	66.037

Based on Table 4.4 above, it shows that there are three factors classified again based on short list achieved. This new element contain item total more or slightly less from variable original. Analysis this also successfully raised an item result of the combined new element from variable original. Three factors arranged according to highest eigenvalue value as variable did not lean to explain different variables in analysis reducing. Eigenvalues is a good standard for determining a factor. If Eigenvalues is extra than one, we need to remember that a factor and if Eigenvalues is less than one, then we need to no longer keep in mind that a factor.

According to the variance extraction rule, it needs to be more than 0.7. If variance is less than 0.7, then we should not recall that factor. First factor shows higher value of variances while others factor show lower value of variances and descending after that. We can conclude from the Rotated Component Matrix's that these are three elements that been compute. It was 66.037% of total variance explains by value. We can relate from the Rotated Component Matrix that these are three elements that been related.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter explains about the conclusion and recommendation of this study which were analyzed through statistical analysis. This chapter covers overall summaries of the study, where the ability of research to accomplish the objectives of this study.

5.2 Conclusion

The survey was conducted to observe perception of oil palm independent smallholders towards bio fertilizer. Based on survey that have been conducted , all of the objective to measure and identify the relationship between independent variable and oil palm smallholder's perception towards bio fertilizers and to determine the most dominant factor that influence oil palm smallholder's perception towards bio fertilizers.

From this survey, benefits was the most dominant factor that influence the perception of oil palm independent smallholders towards bio fertilizers compared to the others. Oil palm independent smallholders' perception includes level of knowledge and cost of bio fertilizer a. Most of respondent in Felda Bukit Waha, Kota Tinggi, Johor perception based on benefits of bio fertilizer. For example, their perception which they focused at the benefits of bio fertilizer.In SSA, for instance in Eastern Africa, low demand because of

lack of awareness and expertise of bio-fertilizers has led to terrible improvement of the bio-fertilizer zone (Masso et al., 2015).

Cost of bio fertilizer also is the factor in using of bio fertilizers. Demands of bio fertilizer can influence the cost of producing bio fertilizer. Despite the potential of bio-fertilizers in SSA, close by production stays a challenge, no longer most effective because of the cost of producing however moreover the confined demand, in addition to bad delivery mechanisms that could be related to the specific necessities for coping with and storage situations.

5.3 Recommendation

Government need to improve their rules and regulation towards the use of bio fertilizer especially in Malaysia. It is because government is the most influence agencies because they can encourage smallholders to use bio fertilizers. According to Deputy Minister of Primary Industries, assistance to fertilizers and smallholder palm oil incentives remain as always at Kuching, Sarawak. They need to give subsidies on bio fertilizers to the smallholders like all the farmers. This will increase their usage of bio fertilizers in their plantation. Perception is not easy to change but procedure can be changed.

Rural development packages typically search to enhance the life of smallholders through grouping farmers into collectives, farmers' institutions, cooperatives or business enterprise network partnerships (Bennett, Ravikumar, McDermott and Malhi, 2019). This apparently gives for economies of scale and a technological resource base that strengthens right practices in plantation manipulate to decreases fees and risk for all stakeholders. Other than that,

extension officers also need to play an important role in this case. They have to become a middleman in between smallholders and agencies. It is because a good relationship between extension officers and smallholders can make them easy to extract the knowledge from extension officers. They also can know the better ways of using bio fertilizer.

Last but not least, producer of bio fertilizer also need to improve their marketing strategies. Companies have to offer clear facts approximately the correct and a way to use the product at the product packaging. Companies need to hire skill workers via farmers' businesses, to do direct promoting along with demonstration plots and free samples. However, successful merchandising of bio fertilizers technology in sustainable agriculture depends on implementation of programs for raising attention most of the bio fertilizers manufacturers and purchasers.

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APPENDICES

Respondent Code: ……

OIL PALM SMALLHOLDERS PERCEPTION TOWARDS BIOFERTILIZER IN MALAYSIA

As a part of my degree research thesis, I am conducting a survey that investigates the Oil Palm Smallholders Perception towards Biofertilizer in Malaysia. I will appreciate if you could complete the following survey.
Sebahagian daripada penyelidikan tesis sarjana muda, saya menjalankan satu kajian untuk mengkaji Tanggapan Pekebun Kecil Kelapa Sawit terhadap Baja-bio di Malaysia. Saya amat menghargai kerjasama anda melengkapi kaji selidik ini.

All information obtained from this study is confidential and will be used for academic purposes.

Enumerator's Name:……....

Date of Survey: …….....

Place of Survey:……....

Start / End time :……...

Checked by:……...

SECTION A: SMALLHOLDERS PERCEPTION TOWARDS BIOFERTILIZER

Instructions: Please fill in / tick (√) your answer in the space provided.

1. What is your preferred biofertilizer use? **[please state ONE (1) answer only]**

Apakah baja-bio yang anda suka guna? [Tolong nyatakan SATU (1) jawapan sahaja]

…….

2. What is your least preferred choice of biofertilizer? **[Please state ONE (1) answer only]**

Apakah pilihan baja-bio yang paling sedikit anda pilih ? [Tolong nyatakan SATU (1) jawapan sahaja]

…….

3. Please rank this biofertilizer according to your preferences

Sila tanda baja-bio ini berdasarkan kesukaan anda

[1= First choice, 2= Second choice, 3= Third choice]

[1=Pilihan utama, 2=Pilihan kedua, 3= Pilihan ketiga]

☐ Granular Biofertilizer ☐ Liquid biofertilizer ☐ Powder Biofertilizer

4. Is it easy for you to buy the biofertilizer at your place?

Adakah ia mudah untuk anda membeli baja-bio di tempat anda?

1=Very hard Sangat susah	*2=Hard Susah*	*3=Mixed feelingBerbelah bahagi*	*4=EasySenang*	*5=Very easy Sangat senang*

5. Where you do usually purchase biofertilizer? / Dimanakah anda selalu membeli baja-bio?

☐ Factory / Kilang

☐ Shop or store / Kedai runcit

SECTION B: FACTORS INFLUENCING THE USE OF BIOFERTILIZER

Instructions: Please fill in / tick (√) your answer in the space provided.

Arahan: Sila tanda (√) jawapan anda dalam ruang diperuntukkan.

		1	2	3	4	5
1	Biofertilizers can enhance soil fertility/ Baja-bio boleh meningkatkan kesuburan tanah/					
2	Biofertilizers can increase crop yield by 20-30% / Baja-bio boleh meningkatkan hasil tanaman sehingga 20-30%.					
3	Biofertilizers can help stimulates plant growth / Baja-bio boleh membantu merangsang pertumbuhan pokok.					
4	Biofertilizers can help to lessen the indiscriminate use of chemical fertilizers in agriculture/ Baja-bio boleh membantu mengurangkan penggunaan baja kimia dalam pertanian.					
5	Biofertilizer can help to improve food security/ Baja-bio boleh membantu untuk menambah baik keselamatan makanan.					
6	I know about the existing of biofertilizer/ Saya tahu tentang kewujudan baja-bio.					
7	I have an education about biofertilizer in agriculture/ Saya mempunyai pendidikan tentang baja-bio dalam pertanian.					
8	I have a source of information about biofertilizers / Saya mempunyai sumber maklumat tentang baja-bio.					
9	I have a social participation in promote biofertilizer to other smallholders / Saya mempunyai penyertaan sosial dalam menggalakkan penggunaan baja-bio kepada pekebun kecil yang lain.					
10	I am family-based producer / saya merupakan pengeluar yang mewarisi perusahaan keluarga.					
11	Price of biofertilizer influences your decision to choose fertilizer/ Harga biofertilizer mempengaruhi keputusan anda memilih baja					
13	Variations in type of fertilizer affect your decision / Kepelbagaian jenis baja mempengaruhi keputusan.					

14	Variations in biofertilizer texture influence your cost / Variasi dalam tekstur baj-bio mempengaruhi kos anda.					

SECTION CSECTION C : SOCIO-DEMOGRAPHY

This section is to collect the information about respondent's demography.
Instructions: Please fill in / tick (√) your answer in the space provided.
Respondent Information:

1. Gender: ☐ Male ☐ Female

2. Race: ☐ Malay ☐ Chinese ☐ Indian
   ☐ Other (Please specify) ……

3. Age: ☐ Below 20 years ☐ 21 -30 years ☐ 31-40 years
   ☐ 41- 50 years ☐ More than 50 years

4. Marital status: ☐ Married ☐ Single
   ☐ Divorced ☐ Widow

5. Educational level: ☐ Primary school ☐ Professional Certificate/Diploma
   ☐ Secondary school ☐ Degree Bachelor
   ☐ Others (Please specify) …….

6. Monthly income: ☐ Below RM 1000 ☐ RM2500-RM3 000
   ☐ RM 1000 - RM 2500 ☐ RM 3500 – RM 5000
   ☐ above RM5000