APPROVAL

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'I acknowledge that I had read this research project and in my opinion this project is sufficient in term of scope and quality for the award of Bachelor of Technology Management (Innovation)'

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SUSTAINABLE AGRICULTURE MANAGEMENT FOR PALM OIL PRODUCTIVITY ENHANCEMENT. A CASE STUDY AT FELDA WILAYAH MEMPAGA

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This report is submitted in partial fulfilment of the requirements for the degree of Bachelor of Technology Management (Innovation) with Honours

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June 2015

DECLARATION BY OF ORIGINAL WORK

I declare that this project entitled “Sustainable Agriculture Management For Palm Oil Productivity Enhancement : A Case Study at Felda Wilayah Mempaga ’’ is the result of my own research except as cited in the references. The project paper has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :……

Name : KHUMAIRUL AZRI RAMDHAN BIN TOKIMAN

Date :……

DEDICATION

I dedicate this research to my beloved family and my beloved parents.

ACKNOWLEDMENT

Finally, I have done my final year project. I have taken an efforts to complete this project since it is started until it is finish. Happily having completed this thesis as planned and submit before due date. I would like to impress my sincere thanks and appreciations to those that involving their self for the help, advice and guidance in completing this project.

Firstly, I am thanks a million to my supervisor, Dr. Chew Boon Cheong which is give a lot of things in preparing this thesis. He is very responsible, understanding and always patient in teaching me to write the report of this thesis. He always give me a moral support when I am down. He work hardly as mentor, coaches, mentor and motivator to make sure I understands and finish this research wisely. He is a very good supervisor and lecturer in UTeM. I am very proud as their supervisee.

Secondly, thank a lot to my group members of this project for all of things. They are always helping me when I have problem and difficult situation, sharing information and provide a moral support.

Last but not least, a very thanks to my family and my mom for support me and helping me in completing this project task while living though so many challenges. Thank you for reminding me that I have never been alone. Thank you very much all.

ABSTRACT

In this study, the researcher has focused on the management of sustainable agriculture to improve productivity of palm oil in the Federal Land Development Authority (FELDA) Wilayah Mempaga, Pahang. By implementing the sustainable agriculture, FELDA can be able to increase the productivity, reduce to open a new area for planting palm oil and can reducing occurrence of deforestation. This research paper aims to examine the impacts of implementing sustainable agriculture management by FELDA. Secondly, to assess how FELDA Wilayah Mempaga manage palm oil plantation sustainability and to propose the innovative suggestion to enhance sustainable agriculture management toward productivity enhancement. The data set will be collected through the interview the respondent and by reading the report, journal and book. 30 respondents will selected for the interview session. A series of interview was conducted to collect respondents' answers, while data collected were analyzed qualitatively. The data will be collected from respondent at FELDA Wilayah Mempaga for a period four months from January until April 2015. Through the implementing of sustainable agriculture management, FELDA will improve the productivity of palm oil. Besides, it will increase the quality of crop. Highest demand of agriculture product will be able to improve the income of the rural population and it is very beneficial to them.

ABSTRAK

Dalam kajian ini, pengkaji telah membri fokus terhadap pengurusan pertanian mampan untuk meningkatkan produktiviti kelapa sawit di Lembaga Kemajuan Tanah Persekutuan (FELDA) Wilayah Mempaga. Pelaksanaan pertanian mampan boleh meningkatkan produktiviti, mengurangkan pembukaan kawasan baru untuk penanaman kelapa sawit dan boleh mengurangkan berlakunya penyahutanan. Kajian ini adalah bertujuan untuk mengenalpasti kesan pelaksanaan pengurusan pertanian mampan oleh FELDA. Kedua, menilai bagaimana FELDA Wilayah Mempaga mengurus penanaman kelapa sawit secara mampan dan mencadangkan cadangan inovasi untuk meningkatkan pengurusan mampan ke arah peningkatan produktiviti. Data akan dikumpul melalui temu ramah responden dan melalui bacaan laporan , jurnal serta buku. Siri temu ramah dibuat untuk mengumpul jawapan daripada responden dan data dikumpul dianalisis secara kualitatif . Data akan dikumpul daripada respondent di FELDA Wilayah Mempaga dalam tempoh masa 4 bulan bermula Januari sehingga April 2015. Melalui pelaksanaan pengurusan pertanian mampan, FELDA dapat meningkatkan produktiviti kelapa sawit. Selain itu, ia akan meningkatkan kualiti tanaman. Permintaan yang tinggi terhadap produk pertanian boleh meningkatkan pendapatan penduduk di luar bandar dan ia memberi faedah kepada mereka. .

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

The agriculture sector plays an important role in the economic development of Malaysia. It provides employment in rural areas, improve the income of rural population and ensure national food security. Agriculture sector is broad, encompassing industrial crops such as palm oil and rubber, food and cash crops (also known as the agro-food or food produced of agriculture) such as rice, livestock, and specialty products such as herbs. (Economic Transformation Programme, 2010). Agricultural activities relate to the production of food and goods through farming and forestry. Geography expert, Matt Rosenberg (2014) states the primary sector includes the production of raw material and basic foods. Activities associated with the primary sector include agriculture (both subsistence and commercial), mining, forestry, farming, grazing, hunting and gathering, fishing, and quarrying.

In this study, the researcher has focused on the management of sustainable agriculture to improve productivity of palm oil in the Federal

Land Development Authority (FELDA) Wilayah Mempaga, Pahang. Over the last 50 years, FELDA has open more land for agricultural activities. The main crop that are planted in FELDA is palm oil plantation. The implementation sustainable agriculture in this area will increase the productivity of palm oil plantations arround the FELDA area. Statistics released by the Malaysian Palm Oil Board (MPOB) on palm oil plantation in Malaysia shows that there is an area of 4,853,766 hectares of oil palm plantations in Malaysia in 2010 compared to only 642.00 hectares recorded in 1975. The number of palm oil plantations also recorded 4,370 in 2010 compared 690 in 1975. In 2011, a total of 18.91 million tons of crude palm oil was produced, which is 11.3% higher compared with production in 2010. These statistics indicate that the palm oil industry is an important industry and a major contributor to the country's revenue.

According to Bradley (2014) sustainable agriculture is the act of farming using the principles of ecology, where it is study about the relationships between organisms and their environment. The phrase was reportedly coined by Australian agricultural scientist Gordon McClymont. It has been define as an intergrate system of plan and animal production practices having a site-specific application that will last over the long term.

As a developing country, the agricultural sector is an important sector for Malaysia. The researcher want to ensure that the sustainability in agriculture will be implemented particulary at FELDA. This implementation can give affect on the productivity. Sustainability agriculture may be able to increasing the productivity of palm oil. If the productivity increase, it will change the economy status of goverment, and also to the population that are working in this sector.

In the last decade, concerns about the negative effects of large-scale agricultural development has led to increased efforts to promote sustainability across a range of agricultural supply chain, including oil palm (Azmi 2012). Per hectare, palm oil is more productive than any other edible oil. It is now

the most used vegetable oil, with about 45.3 million tons produced annually worldwide (Dallinger 2011) for use in thousands including processed food products, cosmetics and cleaning products. The sustainability of agriculture can be able to maintaining the soil fertility. It also can increasing the productivity of palm oil. So, the goverment can reduce to open a new area for planting palm oil. It can reducing occurrence of deforestation. Beside that, the habitat flora and fauna are not affected as well and the advantage from that, the balancing of the ecosystem and environment will be maintained.

1.2 Research Question

Since the Federation Land Development Authority (FELDA) was founded, they just focus on opening new project area to increase the productivity of palm oil without thinking about the destruction of the forest and environment in Malaysia. The situation will affecting environment in a long term. Besides, the uses of chemical fertilizers to increase productivity may be affect to the plant itself in the short term period and the environment as large, the uses of pesticides with no proper control also giving the impact on soil fertility in the long run period.

According to Azmi (2012) the expansion of palm oil plantation takes place at the expense of forest areas, peatlands, and local peoples'customary lands, contributing to loss of natural forests, loss of biodiversity, ecosystem degradation, anthropogenic climate change, loss of traditional livelihoods and increasing land conflicts (WWF 2008, Colchester et al 2006). This research will be focused on how to resolve that matter.

Thus, the Research Questions contructed as below:

1.1.1 How far sustainable agriculture management has been adopted by FELDA at Wilayah Mempaga?

1.1.2 How does FELDA at Wilayah Mempaga manage the palm oil plantation at the current steps?

1.1.3 What are the innovative suggestion to enhance sustainable agriculture management at FELDA toward productivity enhancement?

1.3 Research Objectives

The objectives of this study are stated as below:

1.3.1 To examine the impacts of implementing sustainable agriculture management by Felda Wilayah Mempaga.

1.3.2 To assess how Felda Wilayah Mempaga manage palm oils plantation sustanability.

1.3.3 To propose the innovative suggestion to enhance sustainable agriculture management toward productivity enhancement.

1.4 Scope

The scope of this research is focusing on agriculture, where the focus is to assess the productivity of palm oil, particularly in FELDA Wilayah Mempaga through implementing sustainable agriculture. The research is to identify sustainablity agriculture management and what are the activities to ensure the sustainability in agriculture. The research is more specific to palm oil plantation in Felda Wilayah Mempaga. To gain adequate and comprehensive information, the respondents are divided into two groups. The first group from the managerial department ,which are includes managers and executives that have been involving with FELDA management. The second group is people in technoplantation department, quality control, research and development (R&D) department, which comprised of engineers and technicians. Both of categories are playing an important role to answer the questions of interview in order to support the research and adequate and comprehensive information from them.

1.5 Limitation

There are several limitations for this research study. Two limitations are identified in this study. Firstly, the case study is to examine the impacts of implementing sustainable agriculture management by Felda Wilayah Mempaga. The research will not be covering other aspects of the agriculture. The research is only conducted at Felda Wilayah Mempaga. Therefore, the result and the outcome of the study is only suitable for Felda Wilayah Mempaga. Secondly, researcher assumed that all respondents have provided honest and correct answers when the respondents are being interviewed by the researcher.

1.6 Importance of the study

The important of this research is to gain deep understanding on sustainable agriculture and formulating an ecosystem friendly approach towards sustainable agriculture. The benefit outcomes of this research on sustainable of agriculture management can be shared to all parties involved in agriculture sector. They need to understand the importance of sustanability agriculture management in order to ensure that their plants grow productively in high quality. Besides, this research can be used as a reference to the other researcher . By conducting this research, it will helps FELDA to apply the process of sustainable agriculture in improving the productivity of palm oil in this country.

1.7 Summary

Sustainable Agriculture Management is one of the method how to enhance the productivity of palm oil at Felda Wilayah Mempaga. It is not only for the palm oil, but it also including to all type of agriculture. However, in this study the researcher focused for palm oil productivity enhancement. Through the sustainability of agriculture, it can increase the productivity and quality of crops and at the same time, through this way the settlers taught how to manage agriculture very well. Global demand for agricultural products growing has created great potential for improving the sector's contribution to gross national income and elevate the income of the rural population. It’s very benefical and one advantage to the rural population.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is to discuss about the sustainable agriculture management. According to Gold. M (2007), when the first edition of *Special Reference Brieft* was compiled, "sustainability" has become a more familiar term. A goal of archieving a sustainable planet, one that will accommodate the basic needs of its present inhabitans while preserving the resources that will enable future generation to flourish, has gain increasing acceptance. Although certainly not mainstream at that point, sustainable agriculture is now being addressed by the agricultural community in significant ways.

2.2 Teory Sustainable Agriculture

Sustainable agriculture has emerged as a system that recognizes the necessity for both environmental soundness and economic viability (Ikerd, 1993). McIsaac (1996) defined sustainable agriculture as "one that, over the long-term, enhances the environmental quality and the resource base on which agriculture depends; provides for basic human food and fiber needs; is economically viable; and enhances the quality of life for farmers and society as a whole" . To some, sustainable agriculture is more of a goal, although others see it as practices; however, most do agree that future agricultural systems should be economically sound, environmentally protective, and socially acceptable (Northwest Area Foundation,1994).

According to Eric Licthfouse, (2009) sustainable agriculture is a rapidly growing field aiming at producing food and energy in a sustainable way for humans. Sustainable agriculture is a discipline that addresses current issues such as climate change, increasing food and fuel prices, poor-nation starvation, rich-nation obesity, water pollution, soil erosion, fertility loss, pest control, and biodiversity depletion. He proposes the solutions of environmentally-friendly based on integrated knowledge from sciences as diverse as agronomy, soil science, molecular biology, chemistry, toxicology, ecology, economy, and social sciences. Indeed, sustainable agriculture decipher mechanisms of processes that occur from the molecular level to the farming system to the global level at time scales ranging from seconds to centuries.

Sustainable agriculture will bring solutions to build a safer world. For that, scientists use the system approach that involves studying components and interactions of a whole system to address scientific, economic and social issues. In that respect, sustainable agriculture is not a classical, narrow science. Instead of solving problems using the classical painkiller approach that treats only negative impacts but sustainable agriculture treats problem

sources because most actual society issues are now intertwined, global, and fast-developing. In this chapter, the researcher also will focus about the process and the impact of sustainable agriculture. The researcher also will sketch the theoretical framework of sustainable agriculture for this research.

2.3 Process Development Sustainable Agriculture

Sustainable agriculture can basically be described as ecological farming practices. Instead of focusing only on the economic viability of the plant, sustainable agriculture involves the use of non-renewable resources effectively, to grow healthy food and improve the quality of life of farmers. The process is a series of actions or step taken in order to achieve the sustainability in agriculture.

According to Leo Horrigon et al. 2002, although no one set of farming practices constitutes sustainable agriculture, he briefly describe certain methods or process that enhance sustainability such as :

i. Crop rotation
ii. No-till and low-till farming
iii. Soil management
iv. Crop Diversity
v. Nutrient management
vi. Intergrated Pest Management
vii. Rotational grazing
viii. Cover Crop
ix. Organic agriculture
x. Rainwater harvesting
xi. Physical removal of weed.

2.3.1. Crop rotation

According to Anderson, R.L (2005), crop rotation is the practice of growing a series of dissimilar or different types of crops in the same area in sequential seasons. Crop rotation gives various nutrients to the soil. A traditional element of crop rotation is the replenishment of nitrogen through

the use of green manure in sequence with cereals and other crops. Crop rotation also mitigates the build-up of pathogens and pests that often occurs when one species is continuously cropped, and can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants. By rotating two or more crops in a field, farmers interrupt pest's reproductive cycles and reduce the need for pest control. Rotation sometimes reduce the need of added fertilizer because one crop provides nutrients to the next crop. Crop rotation involves growing different crops in systematic and recurring sequence on the same land, as compared to monoculture, in which a particular crop is planted repeatedly in the same field. The researcher use the term monoculture to characterize cropping systems that are both temporally and spatially homogeneous (Power and Follett 1987). Crop rotation is probably the oldest and simplest system used to maintain the health of soil. While it might not seem so to the non-farming community, crop rotation has a logical order, chosen so the crops planted today can help replenish the nutrients that the previous crops depleted from the soil.

2.3.2 No tilling and low tilling farming.

These farming systems are based on the premise that minimizing disturbances to the soil will increase the retention of water, nutrients, and the topsoil itself. According to Pedro & Carlos (2001) no-tillage or zero-tillage is defined as a procedure of planting crop or cover plants directly into the soil with no primary or secondary tillage. A special planter is necessary to prepare a narrow seedbed immediately surrounding the seed being planted. No-tillage can be considered as a conservation tillage because it reduces loss of soil and water and leaves a 30% or greater cover of plant residue on the surface.

2.3.3 Soil management

Soil management offers information to manage agricultural soil for optimum crop yields and at the same time maintaining or improving the capacity of soil to provide essential ecosystem functions (College of